Research Update: The Effect of Restricted Grazing on Horse Dry Matter Intake

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Over the past year, there have been several research projects looking at the effect of restricting horse grazing. Cool season pastures can contain substantial amounts of nonstructural carbohydrates (NSC). Although a majority of horses can tolerate moderate to high levels of NSC, research has linked over-consumption of NSC to laminitis, mainly in horses with existing health conditions, including previous history of laminitis, obesity, or metabolic disorders.

One way to limit NSC intake by diseased horses is to simply restrict grazing, however, little research has measured pasture intake during periods of restricted grazing. Researchers in England conducted a trial to determine the relative dry matter intake (DMI) of pasture by ponies allowed 3 hours of grazing per day over 6 weeks. Four ponies were used for the study and were turned out daily in the afternoon into a mixed grass clover pasture. When not grazing, ponies were housed in individual stalls with ad libitum access to water and mixed grass hay. Dry matter intake was determined from change in body weight over the 3 hour grazing period. Ponies gained an average of 0.7 lbs/day and total daily DMI (pasture plus hay) over the 6 week period remained constant, averaging 2% body weight per day. The proportion of total DMI accounted for by grazing rose from 22% to 49% by week 6, representing 0.49 and 0.91% of body weight in weeks 1 and 6, respectively. In conclusion, the increase of 0.49% to 0.91% body weight suggests restricting grazing time became increasingly less effective in reducing pasture intake. It appears the ponies anticipated the restricted grazing time period and as a result, ate more quickly as the trial progressed.

In a different trial at North Carolina State University (NCSU), researchers determined DMI rate in horses having access to pasture for four different time periods: 3, 6, 9, and 24 hours. Eight adult horses were randomly assigned to one of the four treatments for 7 days. The 3 and 6 hour groups were fed free choice grass hay, and hay intake was measured daily. Daily pasture DMI was estimated by calculating the difference between initial and residual forage mass of each grazing cell while total DMI was calculated as the sum of pasture and hay intake. Average DMI rate was 1.96, 1.52, 1.12, and 0.57 g of pasture DM/kg of horse body weight per hour, for horses having access to pasture 3, 6, 9, and 24 hours, respectively. This finding confirms the results from England that DMI rate increases as time allowed for grazing is restricted. Therefore, short periods of restricted grazing are not a good management option for diseased horses, and extrapolation of 24 hour pasture DMI estimates to shorter periods may underestimate pasture intake.

Since short periods of restricted grazing are not a good management option for diseased horses, perhaps grazing at different times of the day will help limit DMI and NSC intake. In theory, DMI should increase throughout the day as NSC increases. Researchers at NCSU set out to test this theory. The experiment measured equine forage intake during morning (AM) and afternoon (PM) grazing periods. Six horses were randomly allocated into one of two groups: an AM or a PM grazing treatment for 14 days. After the first 14 days, horses were switched to the opposite treatment for an additional 14 days. Morning treatment groups were grazed from 7:00 am-1:00 pm, while PM groups were grazed from 12:30 pm-8:30 pm. Horses were grazed on tall fescue pastures. Horses had higher intake rates in the PM grazing sessions (6.6 kg/day) compared to the AM sessions (5.6 kg/day). These results confirm pervious beliefs that horses increase their DMI throughout the day, likely in response to increases in NSC. Therefore, owners with diseased horses or ponies should limit afternoon grazing when grasses tend to be high in NSC.

One last strategy for restricting pasture intake, while still allowing exercise, is the use of a grazing muzzle. Grazing muzzles can be used to reduce pasture intake and are alternatives to isolating horses in dry lots or stalls. There is limited information on the extent of intake restriction imposed by grazing muzzles. Therefore, the objective of a study conducted by researchers in England was to quantify the effect of wearing a grazing muzzle on forage intake by ponies. Four mature ponies were used and pasture intakes were measured on four, 3-hour occasions per pony when fitted with a muzzle or grazing without a muzzle. Pasture intake was determined by change in body weight after grazing. Pasture intakes were significantly reduced when ponies were fitted with a grazing muzzle. Ponies averaged 1 lb of forage per 3 hours with grazing muzzles compared to 7 lbs of forage per 3 hours without a muzzle, representing an 83% reduction in pasture intake for ponies wearing grazing muzzles compared to those without. These data suggest grazing muzzles are an effective means of restricting pasture intake by ponies.

When managing diseased horses on pasture, it is important to be able to limit forage intake. Restricting grazing for short periods is not an effective method for reducing pasture DMI. Grazing periods in the morning, when NSC tends to be lower, and the use of a grazing muzzle have led to reductions in pasture DMI. Although most horses can tolerate moderate to high levels of NSC while grazing, some horses, especially horses with laminitis, obesity or metabolic syndromes, may need to be restricted completely from pasture to ensure health, soundness, and promote weight loss.