Estimating Pasture Dry Matter Intake of Horses

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Fresh pasture is a great source of many nutrients, including fiber, energy, vitamins, and minerals, and can often meet most horses' daily nutrient requirements (e.g., mature, idle, light worked), excluding those performing rigorous exercise and lactating mares. However, it is difficult to quantify how much pasture is consumed while grazing. Factors include: horse to horse variation, body weight, physiological state, environmental factors, pasture quality (e.g., available herbage mass, sward height, plant maturity), horse behavior, and amount of time per day spent at pasture. This article discusses variables and their application in predicting pasture intake with the aim of providing tools for more accurately accounting for pasture nutrient intake.

Pasture intake can be estimated as a function of body weight for horses that graze continuously over a 24 hour period. In general, horses will consume 1.5-3% of body weight in DM/day. The variability is likely a function of several factors including: amount of forage available for grazing, degree of forage maturity, sward height, forage type, and physiological state of the horse (e.g., maintenance, lactating). An average pasture DM intake of 2.5% body weight can be used as an estimate when horses are grazing pasture 6-8" tall at the start of grazing for 24 hours. Monitoring body condition helps to determine if this estimate is correct. For example, if a horse is becoming over-conditioned or fat, reduce the amount of time allowed to graze.

Estimation of pasture DM intake is slightly more complicated when the grazing period is less than 24 hours per day. Study results indicate pasture intake rate is accelerated when access to pasture is restricted. A North Carolina State University (NCSU) study reported intake rates almost doubled in the first four hours of pasture turnout versus the second consecutive four hours. Additionally, DM intake in the first four hour grazing period provided horses with 55% of their daily required calories. Results from another NCSU study determined when horses were turned out for 3, 6, 9, and 24 hours a day, their intakes changed dramatically. Dry matter intake rates were 1.96, 1.52, 1.12, and 0.57 g DM • kg BW-1 • h-1 for the horses turned out for 3, 6, 9, and 24 hours, respectively, with the 3 hour DM intake rate being almost triple that of the 24 hour rate. When calories from hay were added to supplement the ration of the 3 and 6 hour groups, there was no significant difference in total calories consumed among any of the four treatment groups. Results suggest a reduction of time at pasture does not always translate into a reduction of pasture intake due to the horse's ability to increase pasture intake rate.

Estimated amount of pasture consumed (g DM/ kg BW) = $5.12\sqrt{x}-2.86$ (where x is the number of hours of pasture access).

To quantify pasture DM intake in horses grazing less than 24 hour periods, NCSU researchers compiled data to develop an equation to estimate pasture intakes based on number of turnout hours.

This equation helps estimate the amount of forage consumed from pasture. Combining this information from measured or estimated forage nutritive values will allow more accurate formulations for daily rations. The equation can be used for horses and ponies grazing well managed pasture (e.g., <10% of the pasture consisting of bare spots and/or weeds and grazing is initiated at 6-8" high and stopped when plant height reaches 3-4") from 3-24 hours and gives a more realistic estimation of how much a horse is actually consuming while grazing.

Future studies that can increase the robustness of the equation include looking at various grass and legume species and how this may alter intakes. Palatability is likely a key factor in estimating pasture intakes and may alter how much forage is consumed. Additionally, intakes may be affected by differences in herbage mass availability and plant maturity. For example, horses on pasture with dense, mature herbage mass may consume at different rates compared to horses on pasture with limited amounts of immature herbage mass. Finally, horse physiological status will have an impact on pasture intakes, as horses with higher metabolic requirements will consume more than horses at maintenance or lower metabolic requirements.

Research is still needed to confirm and extend knowledge of estimating pasture intakes, and additional factors need to be considered. However, the newly developed pasture intake estimation equation is a step in the right direction and provides an increased understanding of horse forage intakes and nutritional needs.