A comparison of four different forage presentations and their effect on consumption time and rate: A pilot study.

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Introduction

Increasingly, slow feeders are being used within day to day horse husbandry to facilitate provision of a set amount of forage while also extending consumption time. The pilot study aimed to provide information as to how three products intended for the purposes of forage presentation perform and compare both to each other and to feeding hay from the floor. The four presentations were a standard 50mm mesh haynet (SNET), a small holed 25mm mesh hay net (SHNET), a hay ball (HBALL) and the floor (FLOOR).

The study compared feeding practices based on the following parameters: overall consumption time (CT) and hourly consumption rate (CR).

Method

The sample population for the pilot trial consisted of 10 horses, 4 geldings, 3 mares and 3 stallions, weighing 433kg ±161kg and of 11.5 ±7.5 years of age.

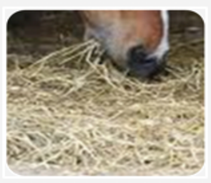
A hay ration of 1.75% dry matter of each horse's bodyweight was provided at two points throughout a 24-hour period, between 8-9am and 4-5pm (in-keeping with current routine). The forage ration was weighed out daily using an electronic spring balance and divided equally over the 24-hour period (37.5% during the day and 62.5% overnight).

The horses were stabled (with no turnout on grass) throughout the trial (management which they were accustomed to). This helped to maintain adequate incentive towards forage, this being their only source of long fibre.

Participants were required to have had regular anthelmintic treatment and a dental evaluation within 12 months of the trial commencing. All horses were habituated to each forage presentation and the forage ration quantity prior to the trial starting. Any exercise remained constant throughout the trial period.

The trial ran over a 28 day period. Prior to the study, horses had been fed their forage from the stable floor. Throughout the study all forage was presented according to condition (am and pm).

Conditions



FLOOR
Hay will be fed from the floor.

SNET
Hay will be fed from a Standard haynet (Mesh size: 50mm)

SHNET
Hay will be fed from a slow feeder small holed haynet (Mesh size: 25mm)

HBALL
Hay will be fed from a spherical shaped hay ball feeder with thirty-two flat faces with 50mm holes.

Measurements

Consumption Time (CT)

During treatment periods, CT was measured on days 1 and 7 of each week. On measurement days, horses were observed during the day (8am-5pm) and the time which it took for them to consume their hay ration was recorded to the nearest hour.

Hourly Consumption Rate (CR)

On measurement days hourly CR was measured during the day (8am-5pm) or until the ration was finished. The hay was weighed every hour using an electronic spring balance and recorded (taking into account the weight of any forage presentation).

Results

Consumption rate was compared across all four conditions for each horse using a Repeated Measures ANOVA. Day 7 data was used as the comparison point for forage presentations due to this providing a more realistic representation of daily use.

Consumption Time

CT on day 7 was seen to increase in all presentations compared to feeding hay from the FLOOR except the SNET presentation where CT decreased by an average of 10.7%. While use of a SHNET showed an average increase in CT of 66.4% and HBALL 4% compared to feeding hay on the FLOOR.

Consumption Rate

When hay was presented on the FLOOR, 70% of horses had consumed >50% of their hay ration within the first hour and >75% in the second hour, 90% having finished their ration completely within the third hour. Presentation using the SNET showed a slight reduction in intake within hour one but still 100% of horses had finished their ration by hour three. With the SHNET, consumption was observed to be much more spread out, while consumption in the first hour was still seen to be the highest throughout the observation period, subsequent hourly consumption was markedly lower; all horses consuming less than 50% within the first hour and less than 75% in the second hour. While the spread of consumption is not as marked as the SHNET, the HBALL still shows a greater spread of intake over the observed period. Only 30% consuming >50% of their ration within the first hour and 50% consuming >75% within the second hour.

Average hourly CR was significantly decreased (i.e. it took longer for horses to consume) when using the SHNET presentation in comparison to feeding from the FLOOR and SNET. The use of a SHNET reduced average hourly CR by an average of 0.36kg and 0.35kg compared to feeding from the FLOOR and a standard haynet (SNET) respectively.

Correlations

There was a strong positive correlation found between CR FLOOR, SNET and HBALL with bodyweight.

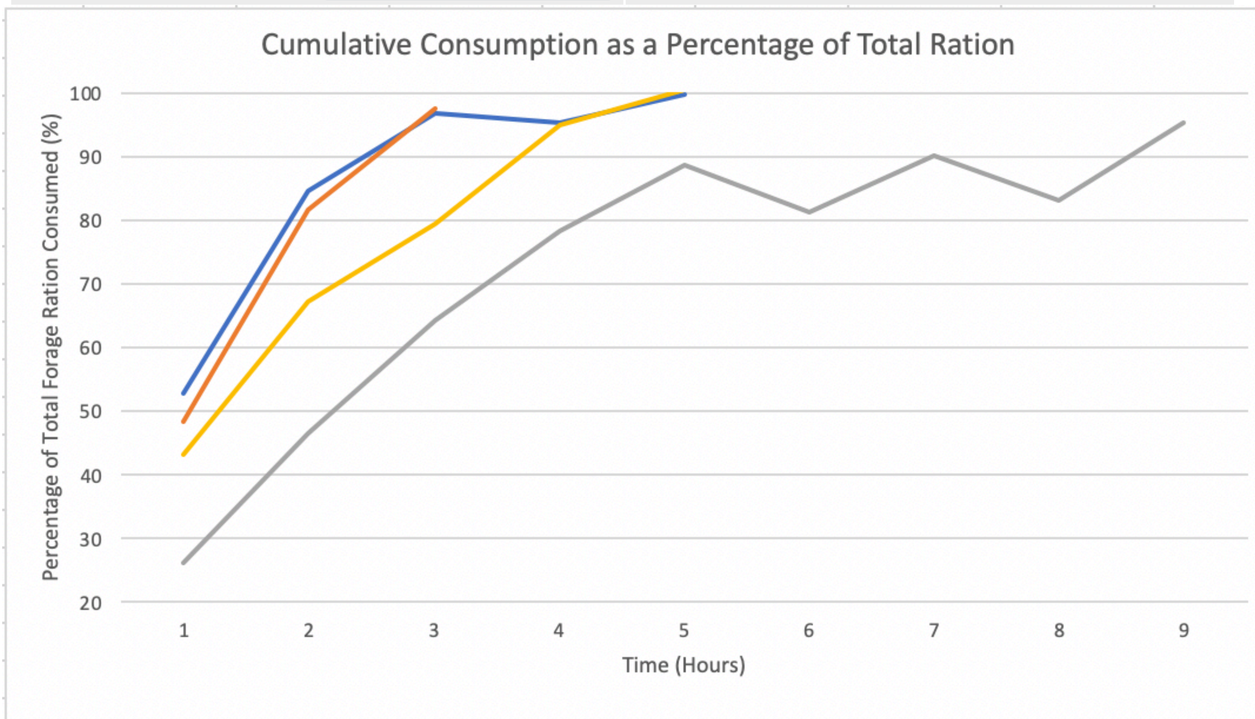


Figure 1: Consumption rate as a percentage of cumulative consumption of total ration over time (hours)

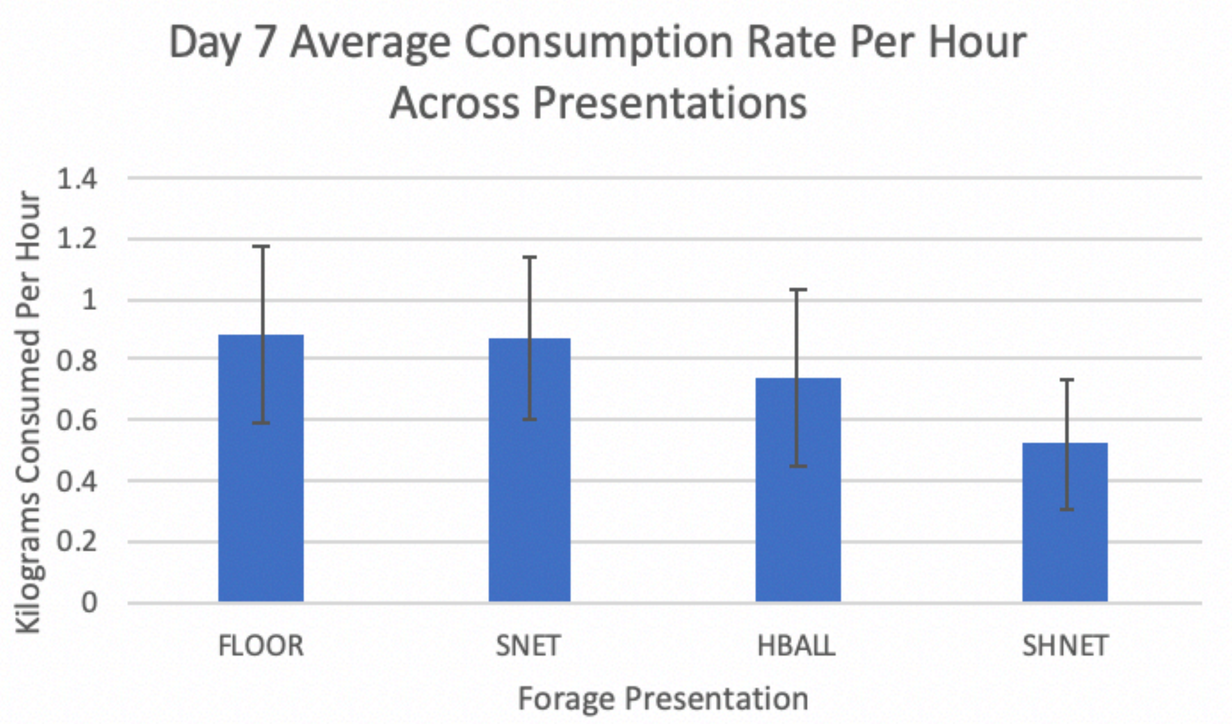


Figure 2: Average consumption rate per hour across all four presentations (day 7)

Discussion

This study has indicated that using slow feeders such as a SHNET or HBALL can increase CT and decrease CR when compared to feeding from a SNET or from the FLOOR. This increase in CT and CR was still observed in habituated horses seven days post introduction. It is worth noting that although all horses were habituated to the forage presentations prior to the trial commencing, there were still decreases in CT (i.e. the horses took less time to consume the forage) between days 1 and 7 of the trial, however these differences were not statistically significant ($p<0.05$). This should be considered when using slow feeders long term. Further research is required to see if varying the use of slow feeders for an individual horse will help to reduce the effects of learnt behaviour and subsequently increased CR and reduced CT. It should also be noted that while on average the slow feeder presentations were shown to extend feeding time, there were differences between individual horses that participated in the study. Further research with a larger sample size is needed to substantiate these findings.

Take home message

Slow feeders can be used to enrich a horse's environment and prolong chewing time. When extrapolated, the findings indicate that on average use of a SHNET may help to extend eating time of a 5kg hay ration an additional 3 hours 36 minutes and use of a HBALL an additional 1 hour 12 minutes compared to feeding from the FLOOR. The use of a slow feeder or combination of hay presentation methods may therefore help to slow consumption rate and be an effective tool for increasing chew time. This may be of particular use to those on a restricted ration who may benefit from an extended feeding time. Furthermore, use of these slow feeders may help modify feeding behaviour leading to smaller feeding bouts spread over a greater period of time.

Further reading: Glunk, E.C., Hathaway, M.R., Weber, W.J., Sheaffer, C.C., and Martinson, K.L. (2014) The effect of hay net design on rate of forage consumption when feeding adult horses, Journal of Equine Veterinary Science, 34 (8): 986-991 Rochais, C., Henry, S., and Hausberger, M (2018) "Hay-Bags" and "Slow feeders": testing their impact on horse behaviour and welfare, Applied Animal Behaviour Science, 198: 52-59

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