

# Effects of Hay Feeding Method on Forage Consumption Time and Nutrient Intake in Stalled Horses

## Introduction

- Horses are designed to eat small, frequent meals throughout the day. In wild populations, horses graze **between 15 and 17 hours per day**.
- Modern equine management systems **limit forage opportunities**, as horses kept in stalls can quickly consume loose hay fed on the ground, which in turn leads to **extended periods of fasting** between meals.
- Extended fasting can lead to health and welfare issues, like **colic, gastric ulcers, and stereotypic behaviors**.
- Haynets** offer a solution for the modern equine management systems by **prolonging the amount of time** a horse spends eating their hay. Generally, the smaller the diameter of the holes in the haynet, the longer it takes the horse to eat the hay it contains.
- While many benefits of haynets have been described in the literature, there is a **lack of research** regarding **optimal haynet design** and **correlated effects on intake of other dietary nutrients**, especially in stalled horses.

## Objectives

- Objective 1:** Determine the effect of hay feeding method on the **forage consumption time** in stalled horses
- Objective 2:** Determine the effect of hay feeding method on the amount of **water and salt consumption** in stalled horses

## References

- Evans, P., and S. Mckendrick. 2010. Equine nutrition: Forages. Utah State University.
- Glunk, E. C., M. R. Hathaway, W. J. Weber, C. C. Sheaffer, and K. L. Martinson. 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.
- Hothersall, B., and C. Nicol. 2009. Role of diet and feeding in normal and stereotypic behaviors in horses. *Veterinary Clinics of North America: Equine Practice*. 25(1): 167-181.

## Materials & Methods

### Horses:

- Nine geldings from the DVU Equestrian Center of approximately similar age and body condition score

### Treatments:

- Using a crossover study design, horses were randomly allotted to one of three feeding methods for three consecutive 7d periods:

- Hay fed on the ground (NO NET)
- Haynet with large holes (10cm; FAST NET)
- Haynet with small holes (5cm; SLOW NET)

### Feeding:

- Horses were fed mixed grass hay at 1.6% of their body weight daily over five feedings. Horses had *ad libitum* access to a plain white salt block and fresh water. Refused hay was weighed daily.

### Nutritional Data Collected:

**Salt consumption:** Salt blocks weighed weekly

**Water consumption:** Buckets were filled to 15.14L five times per day and water levels recorded to determine water consumed

### Hay Consumption Time Data:

- Horses were photographed once per minute (AKASO EK7000 action camera). Horse daily hay consumption time was determined. Both time consuming hay from a haynet and from the ground, were recorded.

### Statistical Analysis:

- Data were transformed if not normally distributed. Variables were analyzed using a repeated measures mixed model with fixed effects of day, week, treatment and interactions. Significance was declared at the  $\alpha=0.05$  level.



Figure 1. Horses consuming hay from no net (top), fast net (middle) and slow net (bottom)

## Results

### Hay Consumption Time:

- Horses spent the **most time** eating with **slow haynets**
- Horses spent the **least time** eating with **no haynet**

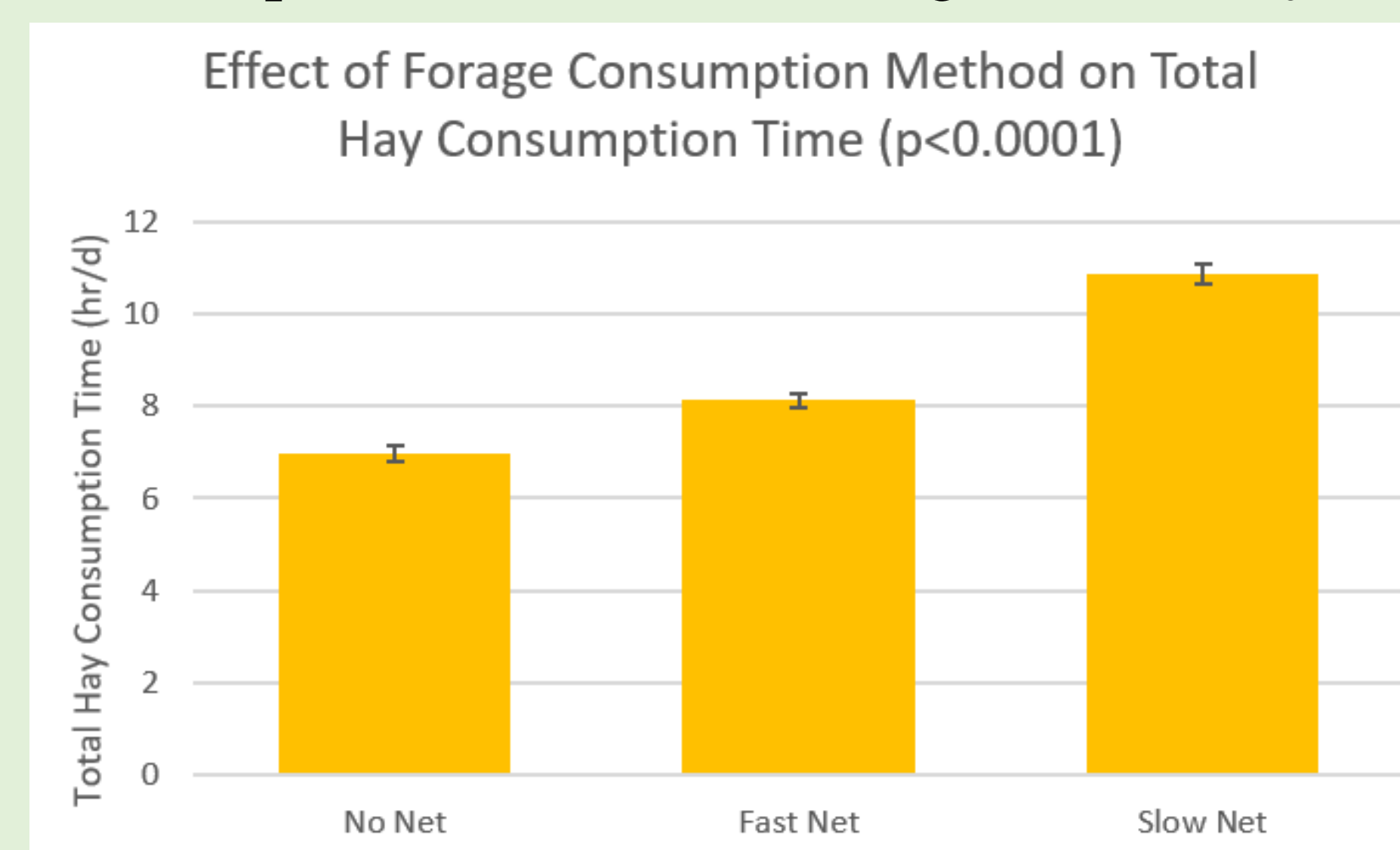
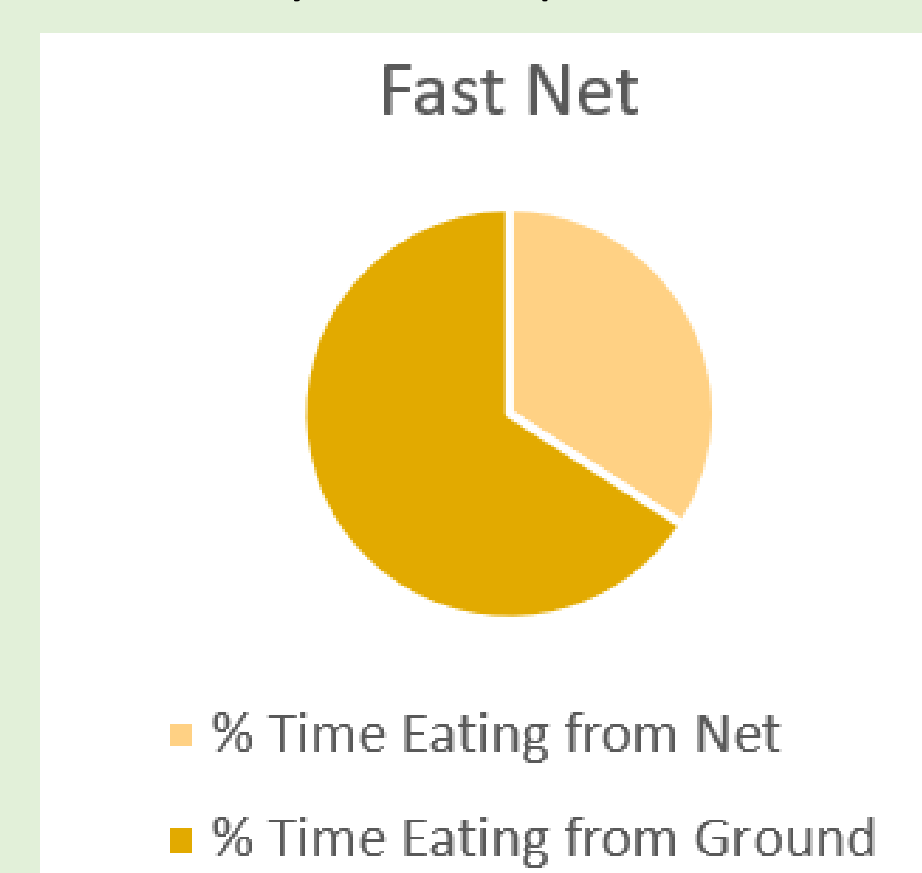


Figure 2. Effect of hay feeding method on total hay consumption time

- Horses with fast nets spent **two-thirds** of their time eating from the ground, rather than from the net

Figure 3. Percent of time eating from net vs. ground with fast haynet



### Water and Salt Consumption:

- Horses drank the **most water** when fed with **no haynet**
- Horses drank the **least water** when fed with **slow haynets**
- No effect** of haynet on **salt intake** was noted ( $p>0.5$ ).

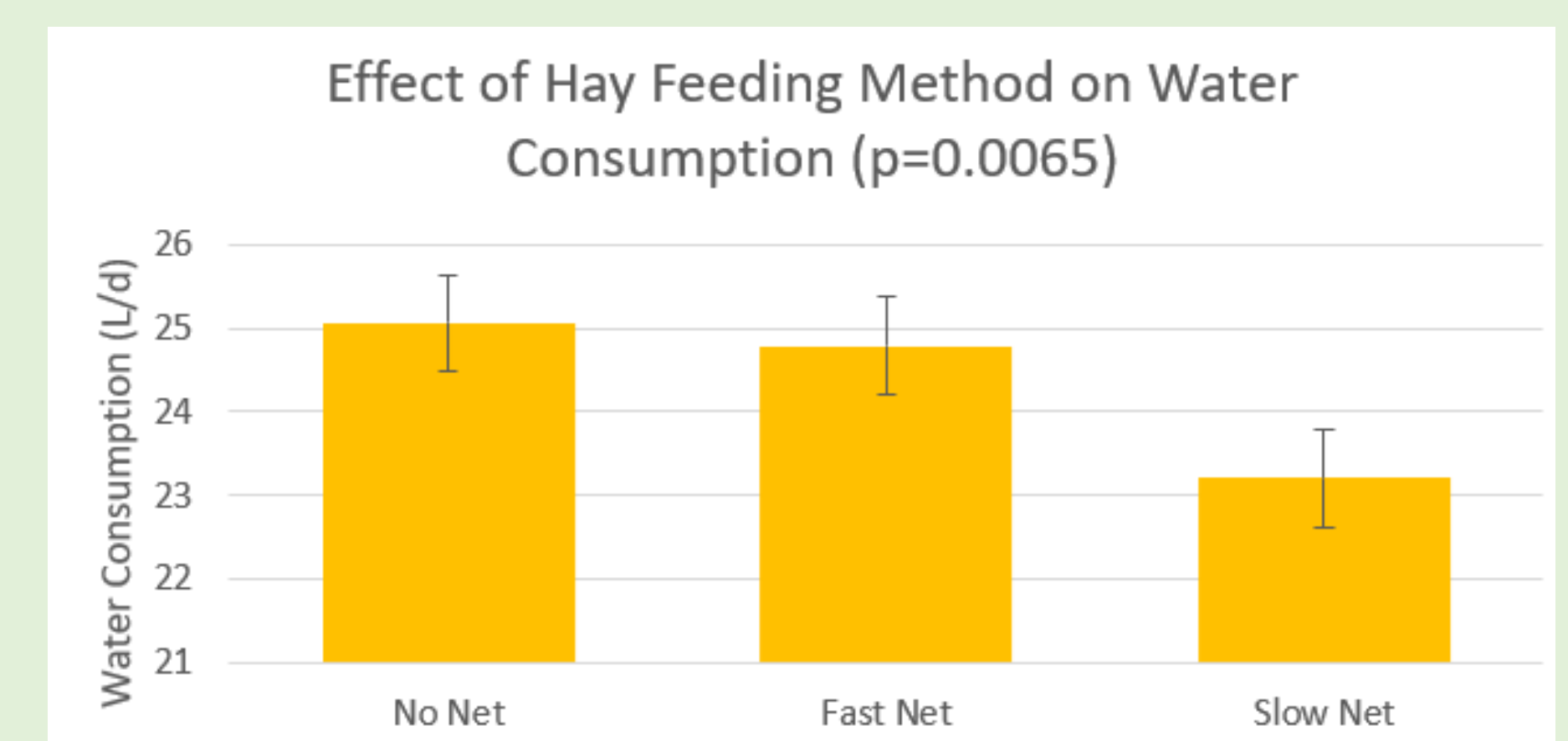
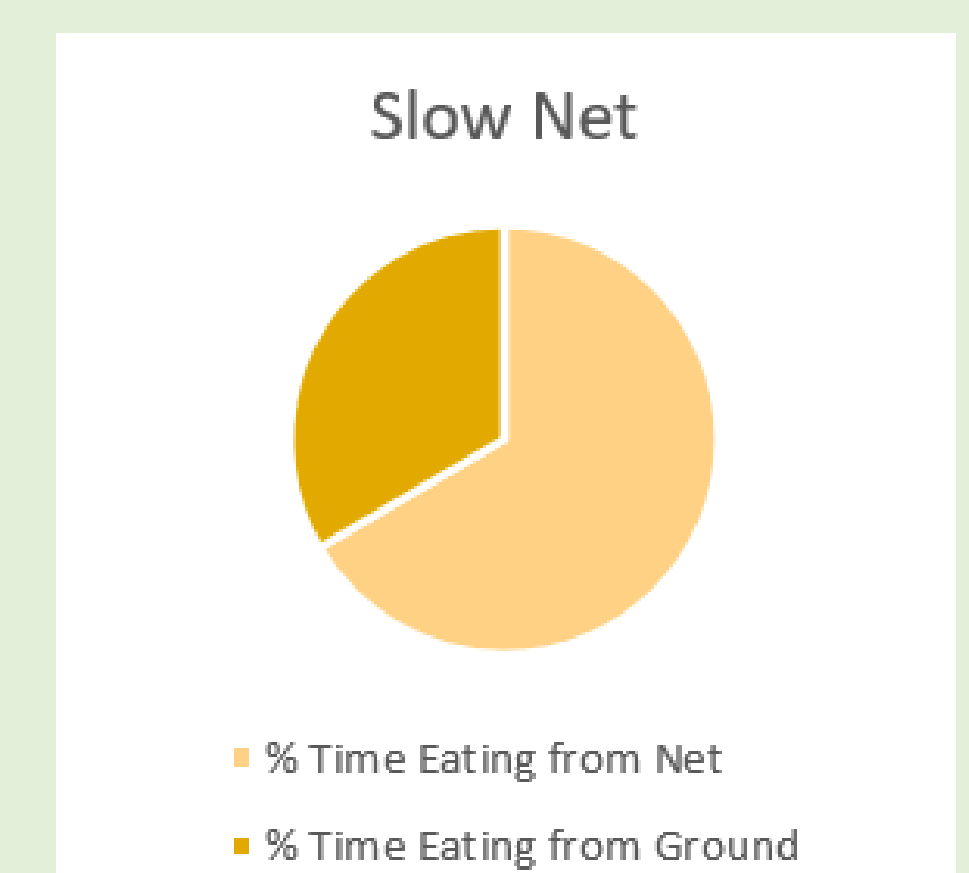


Figure 4. Effect of hay feeding method on water consumption

- Horses with slow nets spent **two-thirds** of their time eating from the net, rather than from the ground

Figure 5. Percent of time eating from net vs. ground with slow haynet



## Conclusions

Slow feeder haynets increased hay consumption time over haynets with larger holes, or no haynet at all. However, water intake was lower for slow feeder haynets, and no effect on salt intake was found.