Pilot Study: Equine Use of and Preference for Salt Blocks in Pastures and Wildlife Interaction

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Abstract

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Salt blocks are often used by equine owners and can be used to attract wildlife. Consequently, there is potential for both horses and wildlife to be attracted to the same location. Additionally, horse owners anecdotally report horses prefer Himalayan salt. The objectives of this study were to determine equine and wildlife use of and preference for salt block types. Three types of salt blocks (plain white salt, red trace mineral, and Himalayan) were used in a randomized block design study. Blocks were randomized between type and location and changed every two weeks. Two pastures (S and N), where horses (n=67) are housed year-round, were used in the study. The S pasture horses were broodmares and young stock, while the N pasture horses were mixed lesson horses and broodmares. One motion-sensing camera, 2017 Browning Strike Force 850 HD, was affixed to a fence post to monitor all three salt blocks in each pasture. Cameras recorded 20 s minimum of video and had red glow infrared emitters to capture night activity. Species, salt pan choice, salt block choice, and duration of licking were recorded. The results reported are from a six-month study (August 2018-February 2019). Cameras were triggered 3438 and 6769 times in the S and N pastures, respectively. The camera triggers were caused by horses 95% and 98%; humans 2% and 1%; and wildlife 0.4% and 0.2% of the time in the S and N pastures, respectively. Wildlife spotted included raccoons, coyote, deer, groundhogs, fox, and birds. Only three incidences of wildlife (raccoons and a fox) visiting a white salt block was identified in the S pasture. Of the camera triggers, 71% (S) and 67% (N) of the time horses spent time licking mineral blocks. The majority of salt block licking occurred between 08:00 and 20:00 hours, and horses spent an average of 19 ± 11 s (average ± standard deviation) per visit licking a salt block. Statistics were conducted using Microsoft Excel. There were no differences in the average licking duration between the salt block types (P=0.47, ANOVA). Most horses (64%) were identified licking salt blocks at least ten times. Chi-square

analyses indicate that 70% of these horses (52% of the total herd) demonstrated nonrandom pan selection ($P<0.05$). Pan choice may be influenced by other resource locations in the pasture. Negligible wildlife use of salt blocks, from August to February, indicates little risk of potential zoonotic disease transfer at mineral feeding stations. However, this pattern may change based on season.

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Introduction

Provision of salt blocks is a common practice for equine owners (Murray et al., 2015) and is also recommended for animals on rangeland even when natural salt is readily available in the soil (Chapline and Talbot, 1926). Salt block and water placement have even been used as a tool to influence grazing patterns in livestock (Porath et al., 2002). Additionally, providing other minerals besides sodium chloride through salt blocks to livestock has become a common practice.

Wildlife also use salt blocks. Small mammals documented using salt blocks include porcupines, chipmunks, mice, squirrels (Anthony et al., 1986), and hares (Faber et al., 1993). Wild ruminants, such as elk (Dalke et al., 1965), will use salt blocks and mineral licks containing salt that are commercially available for use by deer hunters. Even birds, such as vultures (Coleman et al., 1985), will utilize artificially provided salt. If wildlife and livestock are converging at salt blocks, then there is a potential for zoonosis or other adverse interactions, such as bites. Studies reporting wildlife use of livestock salt blocks were conducted in Pennsylvania (Coleman et al., 1985), Idaho (Dalke et al., 1965), Oregon and California (Anthony et al., 1986), Sweden (Faber et al., 1993), and Africa (Jarman, 1972).

Salt intake will fluctuate in animals when faced with growing or reproductive challenges (Faber et al., 1993), the time of the year, workload (Schryver et al., 1986), palatability of the salt lick (Valk et al., 1998), form of salt lick as either a block or loose salt (Kennedy et al., 1998), and availability of water and its quantity (Dalke et al., 1965). In horses, a need for an increase in salt intake can be due to treatment with furosemide (Houpt et al., 1991). Salt blocks may not be ideal for athletic horses, and it has been suggested that feeding frequency does not affect fluid or salt intake (Jansson et al., 1999). Despite scientific reasoning and nutritional analysis providing a basis for understanding salt intake, some animals will consume salt purely based on habit (Schryver et al., 1986). Previous studies have not utilized motion-sensing cameras for data collection. This study has taken advantage of the technological advantages available and has implemented said cameras into the data collection process.

Himalayan salt block use for horses has recently increased in popularity. Owners anecdotally report that their horses prefer the Himalayan salt blocks although no preference studies have been conducted. There is a cost differential between plain white, trace mineral or “red”, and Himalayan salt blocks. However, as an addition to a properly balanced diet, the higher priced blocks provide no additional nutritional benefit. Additionally, many equine owners overfeed supplements while their animals do not require any supplement, which causes those horses to be twice as likely to have a dietary excess (Murray et al., 2015). No preference studies have been conducted on salt blocks, but researchers have deduced that animals will ingest salt blocks with less (95% vs 99% NaCl) sodium (Valk et al., 1997) and determined that chlorine is the more important nutrient (Chaplane et al., 1926). However, some research postulates that there is a need for sodium in some animals (Faber et al., 1993). In accordance with the National Research Council for horses, the nutrient with a greater requirement on a grams per day basis is chlorine regardless of stage of growth, work load, or pregnancy status (NRC, 2007). Chloride is generally provided as part of sodium chloride, which provides the animals with sodium and chloride in a one-to-one ratio. It is also unknown whether horses or wildlife would preferentially visit a certain type of salt block commonly used for horses.

Objectives

The first objective of this study was to quantify frequency of horse visitation to salt blocks. Another objective was to determine if horses preferred a certain type of salt block over others. The final objective was to identify wildlife species and their frequency of salt block use in horse pastures.

Materials and Methods

Horses

The horses (n=67) used for this study were part of a university teaching herd. They were fed to maintain body condition and growth rate where applicable. Different groups of horses (Table 1) were in the pasture according to course needs at different times of the year. Two pastures of horses were observed for the duration of the study.

Table 1: Herd Characteristics for S and N Pastures

Horses	***Breed***	***Age***	***BW (Average)***	***BCS (Average)***	***NRC classification***	***Dates in pasture***
Group 1	Mixed	8 months - 21 years	Foal: 282 kg Adult: 552 kg	5.46	Growing; Light Work	08/09/18-01/04/19
Group 2	Standardbred, Quarter Horse	1 year- 20 years	Foal: 353 kg Adult: 575 kg	5.56	Growing; Pregnant	01/04/19-02/09/19

Diet [Salt Blocks, Concentrate, Forage (Pasture and Hay), and Water]

The salt blocks were placed in three separate feed pans. Before the salt block was placed into a pan, a 200-gram sample was taken from each block by chipping away corners of the block. These samples were taken every time a new salt block was utilized. The horses also had access to unsampled Purina mineral in rubber-covered pans. Hay was sampled from each pasture once a month when new hay arrived after being purchased. Concentrates were sampled every sixteen weeks due to their being commercially manufactured and homogenate in nature. Proper estimates for individual dietary intake could not be made due to the feeding situation in the pasture. One horse was observed eating from a tree. Horses were fed from feed pans where they could be chased away; thus, their concentrate intake may have been affected due to herd dynamics. Pasture samples were taken every two weeks from randomized areas in each pasture in order to accumulate an accurate sample of forage that the horses actually ate. Water was sampled from the automatic waterers every fourteen weeks with a sanitized container to prevent contamination of extra minerals inclusive in the water. Water was freely available at all times in the pasture via automatic waterers.

The three salt block types used in this study (Table 2) were available at the local feed store (Tractor Supply Company). Placement of the salt blocks was randomized among three pans every two weeks (13 times). Changing the placement of the blocks was to reduce the potential effect of a favored location on preference exhibited (Hawkes et al., 1985; Bottom et al., 2004). The salt blocks were placed in three separate feed pans that were weighed down with concrete to prevent movement of the feed pans due to animal interference or weather conditions (Image 1).

Image 1: Salt Blocks in Salt Pans (*Himalayan, Red Mineral, and Plain White, pictured left to right*)

Table 2: Salt Block Guaranteed Analyses and Compositions

	Champion's Choice White Salt Block	***Champion's Choice Trace Mineral Salt Block***	***Himalayan Nature Himalayan Mineral Salt Brick***
SKU	218125099	218127699	105397299
Weight	4 lb.	4 lb.	5 lb.
Price	$2.49	$1.49	$7.99
Guaranteed Analyses	Sodium chloride (maximum): 99.50% Sodium chloride (minimum): 95%	Chloride (maximum): 60.25% Chloride (minimum): 57% Sodium (maximum): 38.75% Sodium (minimum): 37% Zinc (minimum): 0.35% Iron (minimum): 0.20% Manganese (minimum): 0.20% Copper (minimum): 0.030% Iodine (minimum): 0.007% Cobalt (minimum): 0.005%	Chloride: 98% Calcium: 0.10% Magnesium: 0.16% Sulphate: 0.13% Iron: 1.0 ppm

Observations

This study ran for six months, collecting data continuously by trail cameras. Two cameras, 2017 Browning Strike Force 850 HD, were utilized to capture interactions with the salt blocks in two separate pastures. The cameras were fixed to wood posts and set to capture activity via videos for a minimum of 20 seconds with a 30-second delay between each motion sensor triggering. The cameras were checked weekly to switch out batteries and memory cards. In addition, cameras were re-secured to fence posts and lenses were cleaned to ensure consistent captures of area and clear camera lenses for accurate salt pan and animal identification.

Weather was tracked by the Ohio Agricultural Research and Development Center (OARDC) Weather System at the Wooster station (OARDC 2019). The weather in Ohio is comprised each year of temperatures in the extreme cold and the extreme heat and high volumes of precipitation in the spring and winter; however, it mostly remains moderate. The temperatures and weather can fluctuate rapidly from day to day and even hour to hour. These weather fluctuations may cause salt block erosion (Image 2).

Image 2: Erosion and Variation of Himalayan Salt Block

Statistical Analyses

Data was pooled from both pastures for statistical tests conducted in Microsoft Excel. Descriptive statistics were conducted for the different species triggering the cameras. Data analysis of salt licking time was conducted using Analysis of Variance (ANOVA) in Microsoft Excel. Chi-square analyses were conducted for horses that were identified licking salt at least ten times.

Results

The cameras were triggered 3,438 and 6,753 times by horses, wildlife, humans, and weather in the S and N pastures, respectively. Wildlife spotted included raccoons, coyotes, deer, birds, foxes, and groundhogs (Table 3). The average licking time between both pastures was 19 ± 11s (average ± standard deviation). No difference in salt type licking duration was demonstrated among the different salt blocks ($P = 0.47$; Figure 1). There were no significant differences in the average licking duration between pan locations ($P = 0.21$) and ($P = 0.12$) in the S and N pastures, respectively (Figure 2). Duration of licking on a percentage basis closely mirrored incidence; therefore, only incidence data is shown (Figures 1 and 2). Most horses (64%) were identified licking salt blocks at least ten times. Chi-square analyses indicate that 70% of these horses (52% of the total herd) demonstrated nonrandom pan selection ($P<0.05$). Pan choice may be influenced by other resource locations in the pasture. Raccoons, on separate occasions, and one fox were captured licking the white salt block in the S pasture. In addition to licking, the fox also urinated in the white salt block pan. Soon after, a foal visited the station and licked the white salt as well. No diseases have been reported from the equine facility from these wildlife interactions.

Table 3: Total Camera Triggers by Species in Each Pasture

		Number of Camera Triggers
Species	**S Pasture**	**N Pasture**
Horse (*Equus caballus*)	3,260	6,611
Human (*Homo sapiens*)	73	78
Raccoon (*Procyon lotor*)	4	1
Groundhog (*Marmota monax*)	6	0
Coyote (*Canis latrans*)	0	7
Deer (*Odocoileus virginianus*)	2	2
Fox (*Urocyon cinereoargenteus*)	1	0
Bird (Species Not Identified)	1	5
Wildlife Total	14	15
Unknown/Weather	85	34
Total Triggers 8/9/18 through 2/9/19	3,432	6,738

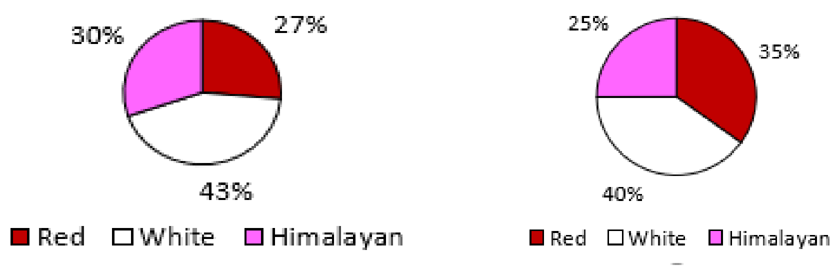

Figure 1: Incidences of Licking Salt Blocks Based on Salt Type (*S left, N right*)

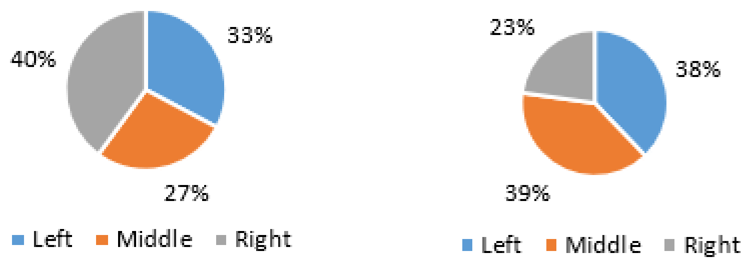

Figure 2: Incidences of Licking Salt Blocks Based on Pan Location (*S left, N right*)

Discussion

The horses in this study did not lick a particular type of salt block any longer than another, which does not agree with anecdotal accounts of horses licking Himalayan salt for longer periods. The additional cost of Himalayan salt blocks may not be justified based on horse preference. The NRC classification of an animal, pregnant, growing, or light workload, did not seem to influence how frequently or how long a particular horse visited the salt station. Horses seemed to mostly choose to visit the salt station based on habit; this is consistent with the study findings by Schryver et al (1987). True preference of salt type cannot be evaluated at this time due to equine-equine interactions and herd dynamics. Horses were sometimes moved to a different salt block or chased away if a new horse began to use the salt station. These interactions also skewed some licking durations as some horses may have been forced to move or leave the salt station completely prematurely. Duration of licking and visitation of the salt station did not seem to be impacted by seasonal changes as was suggested by Schryver et al (1987). The only exception to this was when a snowstorm hit and covered the salt pans with snow. Some horses did still continue to seek salt blocks and dig through the snow even before human intervention uncovered them.

In accordance with work on cattle by Porath et al (2001), some horses may have chosen a specific pan based on position in relation to other resources available in the pasture. This can be seen in the S pasture as the right pan was chosen more often, whereas in the N pasture, the left and middle pans were chosen more often. These pans were the closest to water, hay racks, shelter (such as run-in sheds), and good pasture. Most of the horses in this study that regularly visited the salt pans demonstrated preference for visiting some pan locations more than others. Even though there were individual preferences, the two pastures averaged together demonstrate that there is no discernible preference between pan placement or salt type. The preference for loose salts versus salt in block form, as discussed by Kennedy et al (1998), could only be minimally observed. The red mineral salt block tended to break apart and shatter easily when dropped, sampled with a chisel, or stepped on by some of the horses while at the salt station. The results, however, do not support a preference of the red mineral type over the other two types available, or vice versa, despite the form difference.

The cameras were triggered every time motion was detected. Among those triggers, horses made up an overwhelming majority (>95%) followed by humans (1-2%), unknown or weather triggers, and, very minimally, wildlife (0.2-0.3%). Cameras recorded wildlife such as raccoons, coyotes, deer, groundhogs, and various species of small birds. With the exception of birds, no wildlife was spotted in the presence of horses. Only a few instances captured a raccoon, on separate occasions, licking the white salt block. However, this licking was not in competition with nor in the presence of horses; therefore, there was little potential risk for bites or zoonoses that are transferred by bites. Since the raccoon salt visits were short and too innumerous, they cannot be used to determine either salt type preference or pan location preference.

Conclusion

This study sought to determine if horses had a preference for one commonly used salt type over others, and to determine if wildlife also visited salt stations. Based on frequency of salt station visits and licking duration, no preference for a certain salt type was found. However, it was observed that herd dynamics and proximity of the salt stations to feed locations in a pasture may influence salt type preference. Additionally, it was also observed that horses tend to visit the same salt pan by habit rather than by the salt type the pan contains. The extremely low incidence of wildlife use of salt blocks in the equine pastures studied suggests that the risk for bites and zoonotic disease transfer at salt stations in Wooster, Ohio is negligible for the time of year during which this study was conducted.

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