

The Effect of Waterer Color and Cleaning Frequency on Sheep Water Consumption

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INTRODUCTION

Water is an essential nutrient across animal species, and livestock animals specifically require adequate hydration in order to both maintain their general health and to produce at their optimal capacity. A variety of factors have demonstrated influence on water consumption, such as salinity and temperature (“Water requirements for sheep and cattle,” 2014), and it is important for producers to be able to control as many of these factors as they can to encourage hydration. Two factors that producers have complete control over and offer potential in altering water consumption are the color of the waterer and the frequency that the waterers are cleaned.

Sheep have dichromatic vision (Jacobs et al., 1998; Shinozaki et al., 2010), and previous studies have also demonstrated that sheep can distinguish between opposite colors such as yellow versus blue and red versus green (Tanaka et al., 1989). An understanding that sheep can recognize different colors leads to the possibility that they may prefer certain colors over others, giving producers the ability to manipulate the waterers to reflect the overall preference.

In terms of cleaning frequency, the general recommendation is that waterers are cleaned frequently, but no time frame has been defined in previous literature (Lardy et al., 2008). By understanding how sheep interact with waterers that are not cleaned for a given length of time, producers can implement a standard cleaning routine that both accounts for sheep tolerance for time between cleaning and maximizes efficiency for producers.

OBJECTIVES

The objectives of this study were:

1. To investigate if sheep have a preference for their waterer color (yellow versus blue versus black)
2. To investigate if sheep have a preference for how often their waterers are cleaned (every day versus every 4th day versus every 7th day)

HYPOTHESIS

Based on these objectives, two hypotheses were formed:

1. The sheep will prefer to consume water from the blue waterer compared to the yellow or black waterers
2. The sheep will prefer to consume water from the waterer that is cleaned daily compared to the waterers that are cleaned on every 4th day and on every 7th day.

METHODS

- Three waterers (5-gallon flat-backed buckets) per pen (n=4) of sheep were utilized for both procedures
- Waterer weights were recorded every 12 hours to determine the amount of water consumed during this time
- Standard cleaning procedure: remove water and debris from the waterer, scrub the interior with a bristled scrub brush, rinse the waterer, refill the waterer
- Waterers were refilled after each 12-hour period regardless of cleaning schedule
- Waterer locations within each pen were randomized after each measurement
- For color preference:
 - One of each color waterer was placed in each pen (black, blue, yellow)
 - Waterers were cleaned every 12 hours
 - Data was collected for 7 days
- For cleaning frequency preference:
 - Three waterers of the same color were placed in each pen
 - Waterer 1: Cleaned daily
 - Waterer 2: Cleaned every 4th day
 - Waterer 3: Cleaned every 7th day
 - Data was collected for 14 days
- To test individual preferences
- Behavioral data was collected through scan sampling every 30 seconds for 20 minutes per pen
- Primary behavior of interest was drinking from the waterers, but data was also collected concerning eating, interactions with pen mates and humans, and environmental manipulation.
- Data analysis was completed using SAS version 9.4
 - The model for color included the random effects of pen and time of day (AM vs PM) and the fixed effects of waterer position and color
 - The model for cleaning included the fixed effects of day, treatment, treatment x day interaction and random effects of pen, week, position, and time of day (AM vs PM), with a repeated effect of Day.



Figures 1 and 2 demonstrate the set up of the colored waterers within pens 1 and 7 and the sheep interacting with them

RESULTS

Color

- Sheep had a significant preference (P=0.02) for yellow and blue waterers (0.396 gal/head/day, 0.340 gal/head/day) compared to the black waterer (0.204 gal/head/day) with a standard error of 0.038

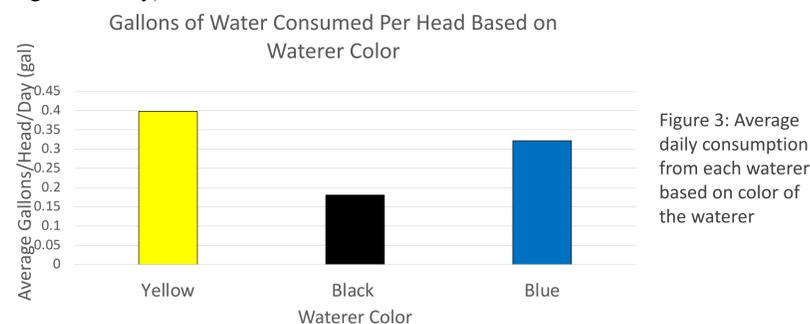
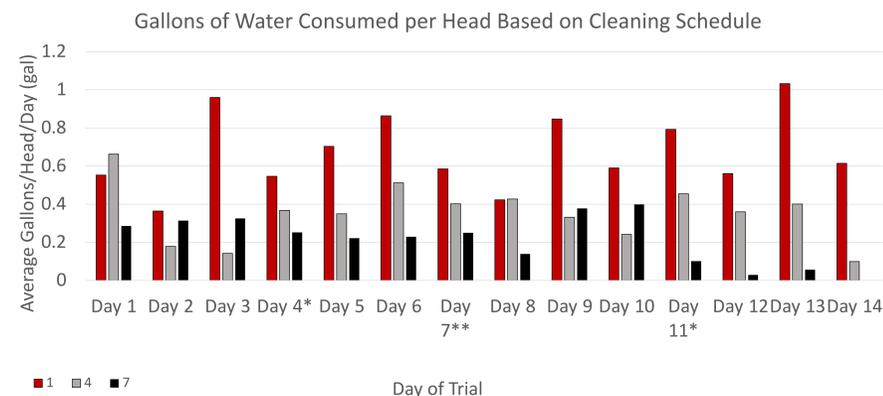


Figure 3: Average daily consumption from each waterer based on color of the waterer

Cleaning frequency

- Sheep had a significant preference (P<0.0001) for the waterer that was cleaned once per day (0.355 gal/head/day) compared to the waterers cleaned every seventh day (0.105 gal/head/day) with a standard error of 0.087.
- Sheep did not find the waterer cleaned every fourth day (0.184 gal/head/day) less preferable than the waterer cleaned daily (0.355 gal/head/day) nor more preferable than the waterer cleaned every seventh day (0.105 gal/head/day)



Figures 5, 6, and 7 (left) show the progression of debris within the waterers over the 7-day period. Waterer 1 was cleaned daily, Waterer 4 was cleaned every 4th day, Waterer 7 was cleaned every 7th day.

Figure 4 (above): Average daily consumption from each waterer based on cleaning schedule. 1: Cleaned daily; 4: Cleaned on the fourth day; 7: Cleaned on the seventh day. * Waterer 4 cleaned **Waterers 4 and 7 cleaned

Behavior

- Sheep on average spent <2% of their time consuming from waterers during observations for both sets of trials
- For the color trials, sheep E only consumed from the black bucket during observations, indicating a possible individual preference, but it is not conclusive that this was solely due to the factor of color
 - All other sheep did not appear to exhibit an individual preference, likely due to lack of observations of the sheep consuming from the waterers
- For the cleaning trials, >80% of recorded incidences of consumption from waterers were from the waterers cleaned daily

CONCLUSIONS

- Sheep prefer to drink from yellow or blue waterers compared to black waterers
 - Sheep may consume more water if given colored waterers rather than black
 - The black waterers may not adequately allow for sheep to see the amount of water within the waterer, thus discouraging sheep from drinking from this color
- Sheep prefer to drink from waterers that are cleaned once per day rather than every seventh day, but they do not have a preference between the waterer cleaned daily versus every fourth day or every fourth day versus every seventh day
 - Producers should clean their waterers between one and four days at a time, but sheep prefer and will drink clean water compared to dirty water, making it optimal to clean waterers as frequently as possible
- With limited observational data of sheep consuming from the waterers, it cannot be concluded that individual sheep had preferences for either color or cleaning frequency

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