Validation of a Water HOBO and the Noldus Observer® for Visits to the Water Nipple Drinker for the Nursery Pig

A.S. Leaflet R2344

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Summary and Implications

Assimilating accurate behavioral events over a significant period of recorded time can be time consuming. If an automatic device could accurately record duration and frequency for a given behavioral event, this would provide a useful tool for ethology. Eleven gilts were used to compare two methods of recording drinking behavior in pigs; Observer software (OBS) and water meter Hobos (WMHOBO) affixed onto the water line. The method of observation affected ($P = 0.0008$) the duration and visits ($P = 0.0048$) at the nipple waterer. The adjusted R^2 value was 0.5633 and 0.6871 for duration and visits to the nipple waterer, respectively. In conclusion, the relationship between methods used to predict time spent at the nipple waterer and number of visits was weak. In addition, OBS method underestimated the number of visits to the nipple waterer and overestimated the total duration of drinking behavior for the nursery pig compared to the WMHOBO. As the relationship between methods was weak, it cannot be concluded that one method is as accurate as the other.

Introduction

Assimilating accurate behavioral events over a significant period of recorded time can be time consuming. A behavioral event is a behavior performed by an animal that is relatively short in duration, for example drinking. A behavioral state lasts a relatively long period of time, for example lying.

Scan sampling is typically used to record drinking behavior. However, due to the short duration of this event, there is a potential for data on an individual or group of animals to be lost.

Continuous viewing is the preferred method for observing drinking behavior, but it is extremely time consuming and labor intensive. If an automatic device could accurately record duration and frequency for a given behavioral event such as drinking, this would provide a useful tool for ethology.

Behavioral observations are a type of tool that are used to quantify animal biological responses, as with physiological measurements, methods of behavioral observation should be validated and selected based on the objectives of that given study.

The objectives of this study were to determine the accuracy of an automatic water meter compared to a human observer for the duration of drinking (time in seconds) and the number of visits at the nipple waterer by nursery pigs.

Materials and Methods

Animals and housing: Eleven crossbred PIC USA gilts (22 ± 2 days of age and 6.5 ± 1.4 kg) were used. All gilts were housed individually in stainless steel, 0.60 m by 1.22 m, pens and had ad libitum access to a corn-based diet and (model Lixit L-80, Lixit, Napa, CA at 8 PSI) nipple waterers (23 mm in length), placed 30.5 cm high from the floor of the pen. Lights were left on 24 hours a day and the rooms were climatically controlled with an average room temperature of 27.9 ^{o}C. Water flow was checked daily to ensure 5 seconds of water flow for each individual water nipple. Pigs were checked once daily at 0800 for general health.

Methodology: Two methods were compared; method one; Observer software (OBS) which was a computer software program designed for the field of ethology. For method one (OBS) two experienced observers continuously watching video footage of the gilts using the Noldus Observer® (http://www.noldus.com/site/doc200401012) and using a specially designed keyboard the observers were able to record all drinking related behaviors for all the gilts.

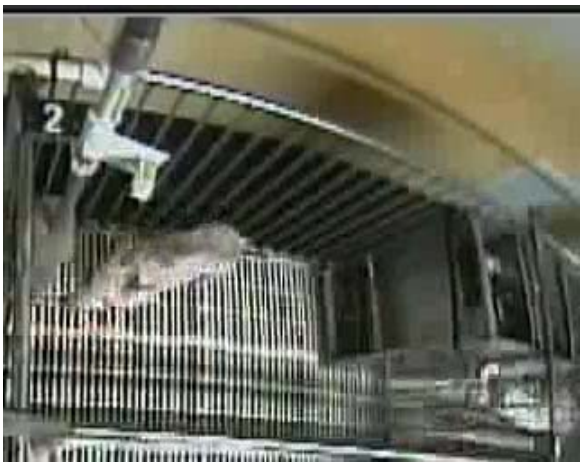
Method two; water meter Hobos (WMHOBO) were affixed onto the water line at 45.7 cm from the nipple waterer. The WMHOBO (U11 3-State/1-Event Logger) was an electronic water meter that recorded every visit and length of time spent at the nipple waterer. All the information was sent to a HOBO data logger, where the data was collected and stored. The WMHOBO was defined as the control standard for drinking duration and visits.

Drinking behavior: The number of visits and length of time spent at their respective nipple waterer was acquired on d 0, 7, and 14 of the trial. One color camera (Model WV-BP 332, Panasonic Matsushita Co. Ltd.) was positioned over four attached pens (Figure 1) which then recorded onto a RECO-204 DVR for 24 hours at 1 frame per second.

Figure 1. Camera placement over the pens that housed one gilt.

Visit to the drinker was defined as when the gilt placed her head over the water nipple waterer (Figure 2).

Figure 2. Nipple waterer that was located in each pen and supplied continuous water to gilts over the trial.



Statistical Analysis: The experimental unit was the pen containing one gilt. Data were transformed prior to statistical analysis, and the duration and number of visits were analyzed using the general linear model (GLM) procedures in SAS® and regression (software for parametric data). The GLM model included treatment (OBS vs. WMHOBO). Pig nested within method was used as the error term.

Results and Discussion

Our ability to detect the number of visits and the time spent at the nipple waterer was affected ($P < 0.005$) by method of observation (Table 1). The adjusted R^2 value was 0.5633 and 0.6871 for duration and visits to the drinker, respectively.

Table 1. Least squares means and standard errors for WMHOBO vs. OBS for the number and duration (seconds) of drinking visits to a nipple waterer over 3 days for gilts from November to December 2006. Pig nested within method was used as the error term.

	Method		
Drinking	**WMHOBO**	**OBS**	***P*-value**
Number of visits	4.94 ± 0.33	3.48 ± 0.32	0.0048
Duration (s)	13.87 ± 1.46	22.58 ± 1.43	0.0008

In conclusion, the relationship between methods used to predict time spent at the nipple waterer and the number of visits was weak. In addition, OBS method underestimated the number of visits to the nipple waterer and overestimated the total duration of drinking behavior for the nursery pig compared to the WMHOBO. As the relationship between methods was weak, it cannot be concluded that one method is as accurate as the other.

Acknowledgements

Thanks to USDA-ARS Livestock Issues Research Unit for housing and taking care of the gilts on trial. Thanks to ISU Department of Animal Science for financial assistance with this project.