Drinker to Nursery Pigs Ratio: Effects on Drinking Behavior and Performance

A.S. Leaflet R2335

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Summary and Implications

The effect of pig ratio to cup waterers was evaluated to determine changes on pig drinking behavior and performance. Ratios of 1:25 (treatment 1), 1:12 (treatment 2), and 1:8 (treatment 3) were studied. Treatment 3 drank more frequently than those provide with one or two cup waterers per pen. There was a trend for pigs provided 2 or 3 cup waterers in a pen to have increased average daily gains. While further research is needed to quantify and confirm these findings, a nursery providing a ratio closer to published guidelines may lead to increase performance.

Introduction

Information is available on the current drinker to nursery pigs' ratios (drinker: pigs). In the UK, producers are recommended a 1:15, while in the US it is 1:10 for nursery pigs. However, a ratio of 1:25 is more typical in US pork production systems. The importance of nursery system design, in regards to placement of key resources is relatively undocumented i.e. previous literature information with regards to the impact of drinkers is limited. Previous work has addressed swine feeder placement and design.

Therefore, the objectives of this study were (1) to determine the total number of visits made to a water bowl drinker by pigs over a 6-h period and (2) to calculate average daily gain when pigs were offered either one two or three water bowl drinkers per pen.

Materials and Methods

Housing and animals: A total of 225 crossbred (21 ± 4 d) gilts weighing 5.38 ± 2.65 kg were housed in nine pens (0.22 m^2 / pig), in a commercial nursery facility near Jefferson City, MO. The research was conducted over six weeks from October to December 2006.
The nursery was equipped with side curtains providing the pigs with a natural lighting cycle.

Pigs were housed on plastic slatted flooring and pens were separated using steel pipe gating (0.91 m height). Pigs in a pen had *ad libitum* access to a pelleted corn / soybean based diet formulated to meet all of their nutritional needs.

Treatments: A total of nine pens were used for behavioral and performance measures. Three pens per treatment were compared. Treatment one (TRT 1) defined as one water bowl drinker per pen. TRT 1 had the water bowl drinker positioned on the same side as the feeder and close to the back wall (F). This provided 1 water bowl drinker per 25 gilts per pen. Treatment two (TRT 2) defined as two water bowl drinkers per pen. TRT 2 had the water bowl drinkers positioned as follows; F and the second positioned across from the feeder along the back wall side (O). This provided 1 water bowl drinker per 12 gilts per pen. Treatment three (TRT 3) defined as three water bowl drinkers per pen. TRT 3 had the water bowl drinkers positioned as follows; F, O, and the third water bowls were positioned across from the feeder next to the alleyway (A). This provided 1 water bowl drinker per 8 gilts per pen. The water bowl drinkers were stainless steel measured 28.58 cm high x 17.78 cm wide.

Climatic data: Environmental temperatures were electronically recorded using data loggers (Hobo™ Pro series, Bourne, MA). A data logger was suspended over each pen from the auger supplying feed to each pen (height 92 cm from the ground). Ambient temperature (^oC) and RH (%) were recorded every 10 minutes during the six week experiment (Table 1). Minimum, maximum, and

Table 1. Weather parameters for the conventional nursery, near Jefferson City, MO, November 2006.

Table 1. Air Temperature (°C) and Relative Humidity (%)
Week 1- Week 6

	Weeks1 through 6					
Parameter	Week1	Week2	Week3	Week4	Week5	Week6
Air temperature, °C						
Minimum[a]	24.79	23.14	22.53	22.42	21.22	20.19
Maximum[b]	31.99	29.33	29.23	27.80	28.02	27.63
Average	28.24	26.42	25.76	25.62	24.83	23.91
Relative humidity, %						
Minimum[c]	35.44	33.60	37.10	43.09	34.54	47.80
Maximum[d]	62.37	59.83	72.16	71.37	70.90	86.90
Average	48.00	43.70	52.98	52.91	49.16	61.58

[a] average minimum daily temperature
[b] average maximum daily temperature
[c] average minimum daily temperature
[d] average maximum daily temperature

average air temperatures (°C) for the two days of behavioral recording were 22.86, 27.13, and 25.31 °C. For relative humidity (%), minimum, maximum, and average were 45.90, 70.25, and 54.64 % respectively.

Drinking behavior: Gilts were approximately 7 weeks of age when behavioral observation were recorded (November 15th and 16th, 2006). One day prior to visual recording, all pigs were identified with an individual number placed between their shoulder blades, using an animal safe crayon (Laco® Twist-Stick Livestock Marker). Behavior was recorded continually over two consecutive days from 0700-1300 at 5 frames per second. One 12 V color CCTV camera (Model WV-CP484, Matsushita Co. Ltd., Japan) was positioned over each cup waterer. Behavior was scored by two trained scientists using Observer 5.0.25 (Noldus®) for the total number of visits to the cup waterer. A pig was defined as drinking when its head was over the drinker for at least 5 consecutive seconds.

Figure 1. Screen print of the picture obtained To garner behavioral acquisition for drinking behavior of the pig.

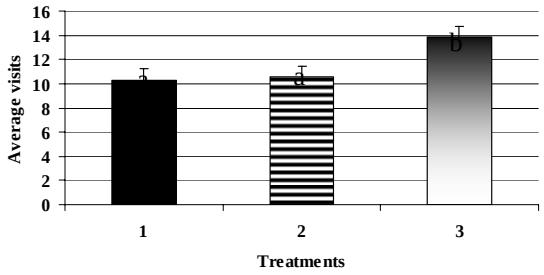
Performance: Individual pig weights were taken at placement (day 0) and at exit (day 42) for calculation of average daily gain (ADG).

Statistical Analysis: The experimental unit was the nursery pen. The number of visits made by each individual pig were evaluated through Observer. Any visit less than 5 s in duration was not included in the final analysis. The data was sorted by day, pig and hour and the total number of visits to the water bowl drinker for each individual pig over each hour was calculated. The total number of visits were analyzed using the GLM MIXED procedure of SAS (2007; SAS® Inst. Inc., Cary, NC) software for parametric data on a pen basis. The model included treatment (one, two, or three water bowl drinkers) and a weight block was used as a linear covariate. Pen nested within treatment and day was included as a random effect in the model. Non-significant ($P > 0.05$) main effect (day) and the interaction were removed from the final model.

Results and Discussion

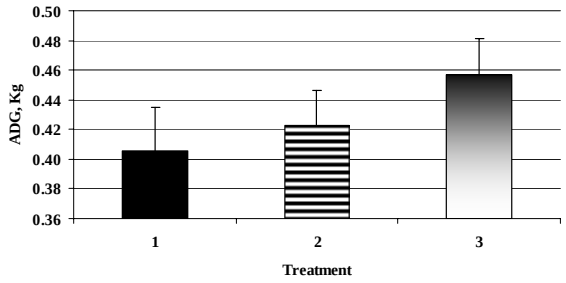
Total number of drinking visits over 6-h differed ($P = 0.0209$) with TRT 1 and TRT 2 pigs having fewer total visits (10.32 ± 0.95 and 10.60 ± 0.84) to the water bowl drinker when compared to TRT 3 (13.88 ± 0.84 total visits; Figure 2).

Figure 2. Average number of drinking visits to the cup waterer per pig from 0700 to 1300 by treatment ($P = 0.0209$).



Ending weights for pigs on trial were 23.78 ± 8.13 kg. There were no differences ($P = 0.06$) for ADG (0.41 ± 0.03, 0.43 ± 0.02 and 0.46 ± 0.02) between treatments respectively (Figure 3).

Figure 3. Average daily gain by treatment ($P = 0.06$).



This study demonstrated that when pigs were offered more places to drink they visited the water bowl drinker more frequently over a 6-h period which tended to increase ADG in nursery age pigs.

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