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Impact of Drinker Type on Pig Performance, Water Use and Manure Production

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Summary and Implications

A summer experiment was conducted to examine the impact of drinker design on pig performance, water use and manure volume. Pigs with access to Drik-O-Mat® bowl drinkers had similar daily gains, lower feed intake and improved feed conversion compared to pigs with access to a WaterSwing® nipple drinker. Water use was reduced 24.8 percent for the bowl versus swing drinkers. Manure volume was reduced 21.6 percent for the bowl versus swing drinker. The difference in manure volume is most likely due to a reduction in water wastage. Selection of drinker devices must include consideration of the manure system design and the need for wasted water for the manure system to function correctly.

Introduction

Research results regarding the impact of a wet/dry feeder and swinging nipple drinker on pig performance, water disappearance and manure volume were reported in the 1997 Nebraska Swine Report. That research demonstrated feeder and drinker selection can impact water usage and manure production. The following experiment was a continuation of that research and compared a bowl drinker with the swinging nipple drinker.

Methods

Pigs were housed in two similar mechanically ventilated, partially slatted finishing barns at the University of Nebraska's Haskell Agricultural Laboratory at Concord. Each barn had six 12 ft x 15 ft pens with 50 percent of the pen area slatted. There were 20 pigs per pen at the start of the experiment. Pen size was not adjusted in the event of pig death or removal for poor performance.

The manure system in each barn was a shallow pit drained periodically into a lagoon (i.e., pull-plug system). The pens on each side of a center aisle had a common pit and pull-plug system and drinkers were assigned to either the north or south side of the aisle within a barn, so manure production could be estimated from manure depth in the common pit for each feeder or waterer type.

Water disappearance (animal intake and waste) was measured for each drinker type in each barn by water meters installed in the water delivery line corresponding to the manure pit location. Manure production was estimated by recording the manure depth in each pit prior to each draining.

All diets were corn-soybean meal based (meal form) with 5 percent added fat and formulated to meet the University of Nebraska recommendations for pigs of high-lean gain potential. Diets were switched on the week pigs in individual pens averaged 80, 130 and 190 pounds. Individually identified pigs were removed for slaughter on the week they weighed at least 250 pounds.

A single Drik-O-Mat® bowl drinker was fastened to the pen partition over the slatted portion of the pen 32 inches from the rear of the 15-foot-deep pen. The lip of the bowl was 10 inches from the floor. The WaterSwing® drinker consisted of two nipple drinkers attached to a delivery pipe which was suspended from a chain anchored to

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the ceiling in the middle of pig pen. The swinging nipple was adjusted for height as necessary to provide 2 to 4 inches of clearance between the shoulder of the pigs (while standing) and the bottom of the drinker.

Drippers were utilized for summer heat relief with dripping initiated at 80°F. Each pen on both drinker types had one, four-hole Farmweld brand wean-to-finish feeder installed perpendicular to the aisle on the solid portion of the pen.

Results and Discussion

The bowl drinkers were originally installed 10 inches above the floor per instructions from the distributor. However, the lightest replication of pigs averaged 34 pounds at arrival. By day five after arrival, it was evident pigs were not consuming adequate water. All bowl drinkers were lowered to 7 inches and remained at this height until 21 days after arrival.

On day 82, an outbreak of swine influenza was diagnosed in all facilities at the swine research unit. Under veterinary direction, pigs were water-medicated with sulfadimethoxine for four days and medication use was recorded by drinker type (Table 1). Water medication use and resultant medication costs per pig was less ($P < .01$) for pigs on the bowl drinkers versus the swinging drinker. An interesting observation was that water usage per-pig per-day remained relatively constant during the four-day medication period when compared to the overall 17-day period during which the medication was provided for pigs on the bowl drinkers. However, water usage was .4-.5 gal/pig/day higher during the medication period when compared to the overall 17-day period for the pigs on the swinging drinkers. The increased usage (assumed to be wastage since no difference in pig performance was measured) is due possibly to the pigs' aversion to the medication and the nipple drinkers allowed for more wastage to occur.

There was no difference of drinker type on uniformity of pig weight within a pen as measured by the coefficient of variation of within pen weights when the first pig in a pen was marketed (Table 2). There was no effect of drinker type on average daily gain. Pigs on the bowl drinkers ate less feed and had an improved feed conversion efficiency compared to the pigs on the swing drinker. The number of pigs that died or were removed from the experiment was not affected by waterer type.

Pigs on the cup drinkers used less water than pigs on the swing drinkers (Table 2). Overall water use was 24.8 percent less for the cups versus swings. The water-to-feed ratio of 1.89:1 for the bowl drinkers was less than the 2:1 ratio often considered a minimum in many nutrition text books. However, it is similar to the ratio reported in a previous study with wet/dry feeders.

While the experiment was designed to estimate manure production for each drinker type, repeated problems with one facility resulted in only one estimate of manure production for each drinker type. Our best estimate is a 22 percent reduction in manure volume for the cup versus swing drinker. No samples were collected for dry matter analysis, but manure from the collection pits under the cup drinkers was observed to flow poorly when the pit plugs were pulled. The eight-inch drain line completely plugged and required mechanical cleanout in one instance. No such problems were encountered with manure from the collection pits under the swing drinkers.

Table 1. Effect of drinker type on water medication usage and costs.

	Drinker type		
Item	Bowl	Swing	P value
Water use, gal/pig/d			
Aug 22 to Sept 9	1.05	1.55	<.01
Aug 27 to Aug 30[a]	.99	1.96	<.01
Drug cost, $/pig[a]	$0.082	$0.162	<.01

[a]Albon 12.5% solution @ $42.25/gal mixed to deliver 30 gm sulfadimethoxine per 128 gal/water.

Table 2. Effect of drinker type on pig performance.

	Drinker type		
Item	Bowl	Swing	P value
No. pens	6	6	
Pig weight, lb			
Initial	38.3	38.5	
Final	251.2	253.8	
CV at first removal	8.8	8.8	>.15
Average daily gain, lb	1.8	1.83	>.15
Average daily feed, lb	4.51	4.67	<.01
Feel/gain	2.49	2.55	<.1
Dead/removed, no.	1	3	>.15
Water, gallons/pig/d	1.00	1.33	<.06
Water/feed, lb/lb	1.89	2.41	<.01
Manure production, gallons/pig/d[a]	.87	1.11	

[a]Not statistically analyzed due to only one observation per drinker type.

Conclusion

The installation of the Drik-O-Mat® cup drinkers resulted in a 24.8 percent reduction in water usage and a 50 percent reduction in water medication expense compared to WaterSwing® nipple drinkers. However, if the manure system requires wasted water for dilution purposes, selection of a cup drinker similar to the one tested in this experiment may create management concerns making their use inadvisable.

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