

The effect of drinker design and position on water usage and performance of growing pigs

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Introduction Inadequate water intake is associated with reduced feed intake, poor daily gain, poor feed conversion, scour problems and lower digestibility of feed in pigs (Thacker, 2001). Factors that can reduce water intake include contamination, high mineral content of water, low temperature, low flow rate from drinker, too few drinkers or poor drinker/nipple position (Thacker, 2001). However, there is a lack of information on the effect of drinker design on water intake and performance. Three designs of drinker commonly used are 1) nipple drinkers, 2) bite drinkers and 3) bowl drinkers. Bite drinkers are reported to be less wasteful than nipple drinkers, especially for newly weaned pigs and bowl drinkers are reported to result in less water wastage due to the water being retained in the bowl (Philips and Philips 1999). A reduction in water usage may reduce the volume of slurry produced and is worth further investigation, especially in the light of storage and land spreading restrictions imposed on pig producers by the Nitrates Directive. The aim of the current study was to investigate the effect of drinker design and position on performance and water usage of growing pigs.

Materials and methods A total of 720 $\frac{3}{4}$ Landrace x $\frac{1}{4}$ Large White pigs were weaned at 4 weeks of age and balanced for weight, gender and sire into groups of 20 which were randomly allocated to one of six treatments over six replicates. Two drinkers were placed in each pen of 20 pigs. Pigs were offered water from 4 drinker designs, 2 of which were in different positions. Treatments included 1) Standard Drik-O-Mat bowl drinker – 2 bowls side by side, 2) Standard Drik-O-Mat bowl drinker – 2 bowls placed 2 metres apart 3) Verba nipple drinker – 2 bowls side by side., 4) Verba nipple drinker – 2 bowls placed 2 metres apart, 5) Halfman Bite drinker – 2 drinkers in a forked arrangement, 30 cm apart or 6) Jalmarsen Bite ball Drinkers - 2 drinkers in a forked arrangement, 30 cm apart. All pigs were offered pelleted feed *ad libitum* from dry multi space feeders (one per 10 pigs) (Etra Feeders, Northern Ireland) with a dietary regime as follows: 3kg of Starter 1, 6 kg of Starter 2 and grower diet until 10 weeks of age. Pigs were individually weighed and feed intakes and water use were established at 4, 7 and 10 weeks of age. Daily Feed Intake, Daily Liveweight Gain, Feed Conversion Ratio and Water Usage were determined from weaning to 7 and 10 weeks of age. The results were analyzed by ANOVA using Genstat 8.

Results The design or position of drinker had no effect on growth performance, feed intake or feed conversion efficiency of pigs (Table 1). Flow rates were measured as (mls/min) 250, 600, 700 and 1200 for the Drik-O-Mat bowl, Verba Nipple, Halfman Bite and Jalmarsen Bite Ball drinkers respectively. Compared to the Drik-O-Mat bowl and Verba nipple drinkers, water usage tended to increase from 4 – 10 weeks of age, when the Halfman bite drinker was used and was significantly ($P < 0.001$) greater when the Bite Ball drinker was used. Overall, from 4 – 10 weeks of age, when the Drik-O-Mat bowl drinkers were placed apart, water usage was significantly ($P < 0.001$) lower than when they were placed side by side.

Table 1 Effect of drinker design and position on pig performance and water usage from 4-10 weeks of age

	Drik-O-Mat		Verba		Halfman Bite	Jalmarsen Bite Ball	Sem	Sig
	Side by side	Apart	Side by side	Apart				
Daily Liveweight Gain (g/d)	495	518	504	495	507	492	8.1	NS
Daily Feed Intake (g/d)	748	752	751	744	756	742	13.1	NS
Feed Conversion Ratio	1.52	1.46	1.49	1.50	1.50	1.51	0.022	NS
Water Usage (l/pig/day)	2.57 ^b	1.84 ^a	2.61 ^{ab}	2.65 ^{ab}	3.27 ^{bc}	3.79 ^c	0.248	***

Within row, means with the same superscript are not significantly different ($P > 0.05$)

Conclusion Neither drinker design or position had any effect on pig performance. However, significantly more water was used with the Halfman Bite and Jalmarsen Bite Ball drinkers compared to the Drik-O-Mat Bowl and Verba Nipple drinkers. It is likely that the majority of the extra water used was wasted and hence potentially increased slurry volume, resulting in an additional 17 and 32 tanker loads (6.82 m^3) of slurry produced per year on a 200 sow unit using either the Halfman Bite or Jalmarsen Bite Ball drinkers respectively. This would have major implications on the dry matter of slurry and hence slurry storage requirements on pig farms.

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