Influence of drinker design and position on the behaviour of growing pigs

N O'Connell, E Magowan, M E E McCann
Agri-Food and Biosciences Institute, Hillsborough, Co. Down, United Kingdom *Email: niamh.o'connell@afbini.gov.uk*

Introduction A number of different drinker types are available commercially for pigs. These typically include drinkers where water is dispensed into a bowl or consumed straight from a water nipple. The design of drinkers may influence levels of competition at the drinker, and also levels of water wastage. This latter factor has adverse environmental implications and may arise from pigs switching between drinkers during drinking bouts, or using drinkers for 'recreational' purposes. The aim of this study was to assess behavioural differences at the drinker between pigs offered different types of commercially-available drinker.

Materials and methods A total of 720 pigs were weaned at four weeks of age and allocated in groups of 20 to one of six treatments until 10 weeks of age. The treatments consisted of four drinker designs, two of which were tested in two different arrangements. Each group had access to two drinkers and treatments were as follows: (1) Bowl A – together (two bowl drinkers side by side), (2) Bowl A – apart (two bowl drinkers placed 1.5 m apart), (3) Bowl B – together, (4) Bowl B – apart, (5) Bite A and (6) Bite B. Bowl A drinkers (Drik-O-Mat, Egebjerg, Denmark) incorporated a horizontal lever which pigs pushed to release water which was retained in the bowl. Pigs therefore drank water from the bowl (width 15 cm, bowl capacity 100 ml). Bowl B drinkers (Verba, The Netherlands) were designed so that pigs could drink directly from the nipple. However, excess water was also retained in the bowl (width 15cm, capacity 210ml). Average water flow rates were 250 ml/min for Bowl A and 600 ml/min for Bowl B drinkers. Bite A drinkers (Monoflo International Inc, Canada) and Bite B drinkers (Bite Button Valve, Jalmarson – Stingy, Sweden) allowed pigs to access water through biting a nipple or a button attached to a spring-loaded valve. Aside from their mechanism for releasing water the main difference between the two bite drinkers was the flow rate they created (700 *vs* 1200 ml/min respectively). The bite drinkers had a forked arrangement which resulted in the two drinkers being 30cm apart. Pigs were housed in slatted pens (0.38m^2 per pig) and had *ad libitum* access to concentrate rations. Behaviour at each of the drinkers was video recorded for one 24 hour period when pigs were four, seven and 10 weeks of age. Instantaneous scans were made of each of the drinkers every hour to record whether or not a pig was using the drinker, the number of pigs apparently queuing to use the drinker, standing close to the drinker (but not queuing), and nosing the floor under the drinker. Both drinkers in a pen were also observed simultaneously for a continuous 10 min period at 0800, 1000, 1200 and 1400 hours. The duration of each drinking bout within these observations was recorded. In addition, the number of times pigs removed their head from the drinker, or switched drinkers during drinking bouts was recorded. The proportion of drinking bouts where pigs left the drinker 'voluntarily', i.e. without being moved or displaced by another pig, was recorded. Data from five of the six replicates of this study were used in analysis (Genstat, Version 6.1). The influence of treatment was analysed by Analysis of Variance, blocked for replicate. The statistical model allowed specific comparisons to be made between different bowl drinker positions (side by side or apart), different bowl drinker designs (A or B), between Bite and Bowl drinkers, and between Bite drinkers A and B.

Results Overall treatment comparisons for selected parameters are presented in Table 1. The proportion of drinking bouts where pigs switched drinkers was significantly higher when bowl drinkers were placed side-by-side rather than apart ($P<0.01$). The proportion of drinking bouts where pigs removed their head from the drinker during a bout was greater with Bite than with Bowl drinkers, and was greater with Bite B than with Bite A drinkers ($P<0.001$). More pigs were observed queuing for Bowl than for Bite drinkers ($P<0.05$), however more pigs were observed standing in close proximity to Bite than to Bowl drinkers ($P<0.001$). In addition, more pigs were observed nosing the ground under Bite than Bowl drinkers ($P<0.001$).

Table 1 Influence of drinker design on the proportion of drinking bouts where pigs switched drinkers or removed their head from the drinker, and the number of pigs observed queuing, standing near or nosing the ground under drinkers

	Bowl A (together)	Bowl A (apart)	Bowl B (together)	Bowl B (apart)	Bite A	Bite B	SEM	P
Switching	0.08^{ab}	0.03^{a}	0.12^{b}	0.03^{a}	0.13^{b}	0.07^{ab}	0.024	<0.05
Removing head	0.05^{a}	0.04^{a}	0.05^{a}	0.03^{a}	0.14^{b}	0.35^{c}	0.026	<0.001
Queuing	0.04^{bc}	0.05^{c}	0.02^{ab}	0.03^{abc}	0.02^{a}	0.02^{ab}	0.009	0.05
Near (not queuing)	0.03^{a}	0.05^{a}	0.01^{a}	0.04^{a}	0.13^{b}	0.15^{b}	0.028	<0.01
Nosing floor	0.01^{a}	0.01^{a}	0.00^{a}	0.01^{a}	0.10^{b}	0.12^{b}	0.025	<0.01

^{a,b,c}: Means in the same row without a common superscript differ significantly

The average length of drinking bouts, or the average proportion of scans where pigs were observed using drinkers did not differ significantly between treatments. However, more pigs left drinkers 'voluntarily' with Bowl B than Bowl A drinkers ($P<0.05$).

Conclusions Placing drinkers apart rather than side-by-side reduced switching between drinkers and could therefore reduce water wastage. Increased numbers of pigs gathered round, and nosing the ground under Bite rather than Bowl drinkers suggest that these drinkers were used for recreational purposes to a greater extent. This may also have been reflected in the fact that pigs removed their head from the drinker during drinking bouts more frequently with Bite than with Bowl drinkers.