

Food Court Design for Large Group Auto-Sort for Grow-Finish Pigs

Brown, J.A., S. Hayne, T. Samarakone, B. Street, and H. W. Gonyou

Prairie Swine Centre, Box 21057-2105, 8th Street East, Saskatoon, SK, S7H 5N9



Harold Gonyou



Jennifer Brown

SUMMARY

This project studied the behaviour and productivity of pigs in large group auto-sort (LGAS) systems using two different food-court designs. Compared to conventional pens we found that pigs in LGAS modified their feeding behaviour by having fewer (5 vs 10-15) and longer meals. Pigs made use of all of the available feeder spaces within the food courts, visiting several each day, however some had difficulty learning to enter and leave the food court. For successful management of LGAS systems, producers should ensure an adequate number of feeder spaces, sufficient room to move in the food court and training methods to facilitate use of the auto-sort scale.

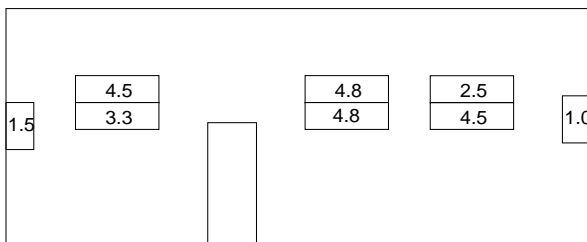


Figure 1a. Food court with feeders located in the Centre of the court. Banks of feeders consisted of 2 or 4 spaces each. Values indicate the percentage of time spent feeding in each bank.

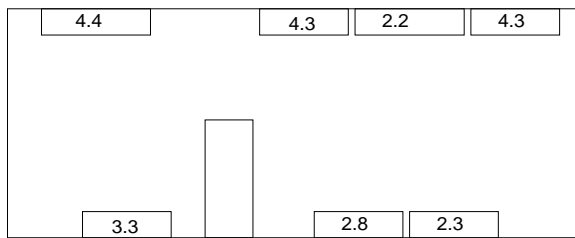


Figure 1b. Food court with feeders located along the walls of the court. Banks of feeders consisted of 4 or 5 spaces each. Values indicate the percentage of time spent feeding in each bank.

INTRODUCTION

The use of large groups for grow/finish pigs makes it economically feasible to introduce new technology, such as auto-sort scales, into pig production. It has been estimated that the ability to sort pigs within their pen has the potential of returning \$5-15/pig depending on whether only marketing or marketing and feed control were implemented. One of the initial fears con-

“Pigs housed in large group auto sort modified their feeding behaviour by having fewer and longer meals... However, some had difficulty learning to enter and leave the food court”

cerning large groups of pigs was that they would fight longer after being put together (English et al., 1988). However, research done at PSC has refuted these concerns, showing that aggression at group formation is similar in small and large groups, and in fact pigs from large groups become more tolerant and show reduced aggression at mixing (Samarakone and Gonyou, 2009).

Early attempts to use auto-sort technology encountered problems with variable feed intake and reduced rates of gain among the pigs (Wolter and Ellis, 2002). Many reports of decreased rates of gain can be attributed to poor feed court design. Most LGAS systems require pigs to pass through an automated scale as they move from the loafing area into the ‘food court’. After eating they return to the loafing area via one-way gates. Some pigs have difficulty learning the appropriate traffic flow pattern through the scale and one-way gates. Common food court problems are too few feeders, or feeder spaces that are blocked by pig traffic or pigs lying in the food court. Our hypothesis is that lying in the food court is encouraged by the most common design, that of centrally placed feeders, because it provides wall space that is ideal for lying and restricts access to feeders.

The objectives of this study were, 1) to evaluate the feeding behaviour and productivity of pigs in LGAS systems using two food court designs, 2) to study changes in feeding behaviour over time in LGAS, and to 3) compare behaviour and productivity of pigs in LGAS with those in conventional small group pens.



Figure 2. Sample of photos used to assess eating patterns and feeder use in large group auto-sort.

EXPERIMENTAL PROCEDURE

Studies were carried out at two locations; the PSC Elstow Research Farm and a commercial grow/finish operation. The Elstow facility housed pigs both in conventional small group pens (18 pigs/pen, 2 feeders per pen) and in large groups of approximately 250 pigs (approx. 1 feeder per 9 pigs). Pigs were 10 weeks of age when moved to the experimental rooms. At the Elstow facility, three rooms were adapted for the study. One room provided conventional small group pens (Conventional treatment), and the other two rooms were modified for large-group auto-sort management (LGAS). Two different food court designs were used in the LGAS rooms; one had feeders in the centre of the pen (LGAS Centre), while the other had the feeders on the walls of the food court (LGAS Peripheral). Each design provided 24 feeder spaces in total (see Figures 1a and 1b).

At the Elstow facility, we recorded the diurnal pattern of scale use, the use of individual feeder spaces within the food court, and eating patterns of individual pigs in LGAS rooms. Movement through the scale ('hits') were studied using automated output from the auto-sort scale. Feeder spaces were photographed at 5 min intervals using a time lapse camera (Figure 2). To identify individual animals, 10 pigs in each study group were paint-marked. Pigs in the Conventional room were weighed at 3-wk intervals using a hallway scale. Weights for pigs in the auto-sort rooms were obtained from the scale records (average of all weights for the day). Pigs were marketed as they reached target weight. At marketing, carcass data were obtained for a subsample of pigs for a comparison of carcass traits in each treatment.

The commercial farm maintained groups of 650 pigs with 60 feeder spaces. On the farm, feeding behaviour was observed in 10 rooms of approximately 650 pigs to determine the diurnal pattern of feeding behaviour at different ages. We again used output from the auto-sort scale, and supplemented this with live observations of four rooms of pigs at different ages over a 24-hr period.

RESULTS AND DISCUSSION

The analysis of feeding behaviour at the Elstow facility showed a clear diurnal pattern with an 8-fold increase in eating in the day-time 'peaks' compared to the midnight 'low'. The pattern showed peaks at 'lights-on' and 'lights-off', similar to what is found in small group pens. Pigs in small groups typically eat 10 – 15 well defined 'meals' in a day. Pigs in the LGAS had approximately 5 meals per day, but the meals were longer in duration than in small group pens. This adaptation was successful, as the pigs in LGAS performed as well as those in small groups.

No differences in performance or feeding behaviour were found for the two food court arrangements studied. Individual animals visited a number of feeders each day, and on average the feeder spaces were used uniformly in both food court arrangements (Figure 1). The study at the commercial farm allowed us to examine changes in eating behaviour as pigs aged. The study rooms varied in age by six weeks. We determined that the average number of entrances into the food court each day decreased as the size (age) of the pigs increased, from nearly 4 entries per day at 40 kg to approximately

2.5 per day at 90 kg. The pattern of eating showed the typical diurnal, two-peaked, pattern described earlier (Figure 3). Of interest in this pattern was that younger pigs had less of a 'drop-off' in the middle of the day. This suggests that the younger pigs were limited by the number of feeder spaces available, and had to shift from eating during the normal peak periods to the less intensive mid-day period.

CONCLUSION

Large group auto-sort systems pose some significant challenges to pigs in terms of eating behaviour. Because the feeders can only be accessed through a sorter scale, the cost of moving to the feeders is greater than in small pens. Despite these restrictions pigs pass through the sorter and eat in a typical diurnal pattern similar to that seen in small pens. However, pigs in LGAS pens only enter the food court 2-4 times each day, and have fewer meals (5 vs 10-15) than in small pens. They compensate by eating longer dur-

ing each meal. They also move freely about the food court, eating from several feeders each day. Young pigs, who require more time to eat, may display a higher mid-day rate of eating, indicative of restricted feeder space. We believe that a key to making food courts work effectively is to make sure the pigs know that food is present by introducing them to the food court, rather than the loafing area. The food court should be spacious enough so that pigs have access to all of the feeders, and a feeder space should be provided for every 10-12 pigs.

ACKNOWLEDGEMENTS

Strategic funding provided by Sask Pork, Alberta Pork, Manitoba Pork Council, and Saskatchewan Agricultural and Food Development Fund. The collaboration of Sierens Equipment of Manitoba, as well as that of the participating commercial farm, was greatly appreciated.

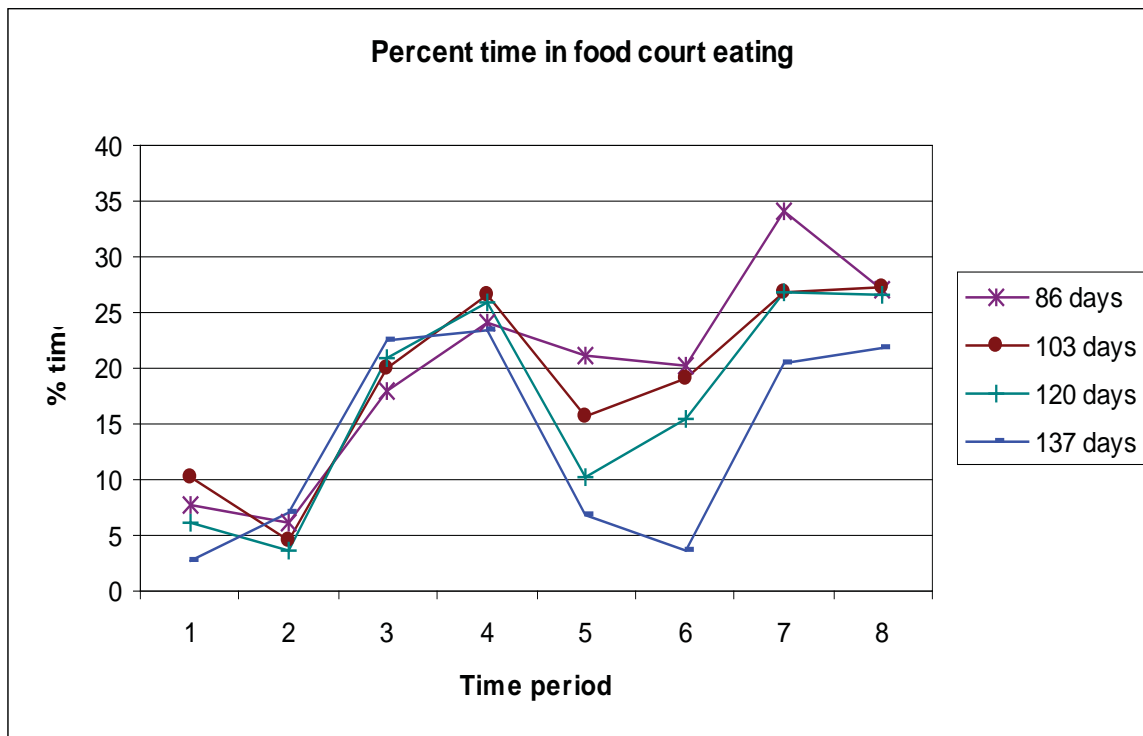


Figure 3. Daily eating pattern of pigs within the food court at different ages. The day was divided into 3-hr periods, starting at midnight.