

Harmful Social Behaviours in Pigs – Is Environmental Enrichment the Solution?

Catherine Moss

Introduction

The welfare of commercially housed pigs is often compromised by harmful social behaviours, such as ear- and tail-biting by pen-mates. Tail-biting is arguably the most serious form, because of its damaging nature and subsequent risks of infection (Van de Weerd *et al.*, 2005). Its welfare and economic implications present an ongoing problem for the pig industry. Previous studies have shown that tail-biting and manipulation of pen-mates is reduced when bedding or a manipulative substrate is provided (Haskell *et al.*, 1996). Such studies led to the EC Directive for the protection of pigs (2001/93/EC) (European Commission, 2001), which stipulates that materials such as straw, compost, sawdust, wood or similar be provided to pigs. This review will highlight the importance of other underlying causes of harmful behaviour and also outline the most recent research into forms of enrichment, including commercial devices, paper and ropes, to minimise such behaviours.

Discussion

Van de Weerd *et al.* (2005) compared the prevalence of adverse behaviours in pigs, with intact tails, from different enrichment backgrounds in a straw-bedded and a part-slatted system enriched with a commercial device (Bite Rite Tail Chew enrichment device, Ikadan System, Denmark). For the study, 372 Large White/Landrace crossbred growing/finishing pigs were initially exposed to early life enrichment comprising either a rooting box, a liquid dispenser, straw bedding or none (barren). Following this, at 10 weeks of age, pigs from the different backgrounds were mixed and placed in either a part-slatted or a straw-bedded system and then observed.

It was found that pigs in the part-slatted system (enriched with a commercial device) spent significantly more time expressing undesirable pig-directed behaviours, including tail-biting, than those with straw bedding, which appeared to prevent the development of tail-biting. This strongly supports findings by Fraser *et al.* (1991) who suggested that straw provides a good outlet for expression of rooting and chewing. The study showed that the use of an enrichment device could not compensate for the deficiencies in the barren part-slatted environment.

The only form of early life enrichment to have an effect was the liquid dispenser and furthermore this was found to affect only pigs housed in the part-slatted system. These pigs showed even higher levels of pen-mate manipulation later on than those from barren conditions. This indicates the Bite Rite Tail Chew in the part-slatted system may not have been as rewarding as their initial enrichment device, the liquid dispenser. Another unexpected finding was that performance in the part-slatted system improved in the latter part of the finishing period. This improvement was probably due to a limitation in the study where pigs in the part-slatted system had to be removed when tail-biting outbreaks occurred.

Although straw is widely considered the most appropriate substrate for environmental enrichment in pigs (Bracke, 2006) and its effectiveness over commercial enrichment devices is highlighted above, straw is not always a practical option. Availability problems and its unsuitability for use in slatted systems means an effective alternative would be useful. Lewis *et al.* (2005) investigated the effect on piglet and

sow welfare of providing shredded paper or ropes to piglets in farrowing crates. Sixty sows and their litters were housed in either barren or enriched crates, the latter containing either paper or fibre ropes. Enriching substrates were introduced when piglets were 10 days old and on days 11, 18 and 27, piglet facial lesions were scored according to severity. The proportion of sows with udder and teat lesions before parturition and at weaning was also recorded.

Piglets enriched with paper tended to have a smaller number of facial lesions but no effect on lesion severity was seen. They also spent less time inactive, less time exploring the pen-fittings and more time interacting with the substrate than barren or rope-enriched piglets. It was also found that rope actually stimulated aggression among piglets because of competition for access to it, which could have led to a higher incidence of injury. Previous studies have shown that providing straw with no increase in space allowance improved piglets' welfare by giving them the opportunity to expand their behavioural repertoire (Vellenga *et al.*, 1983). In this study, Lewis *et al.* (2005) showed the same true of providing paper with no increased space allowance. The limitations of this research were in the presentation of the enriching substrates. While the paper was accessible to all piglets at the same time, the rope was looped through slots in the backboards of the crate so only a limited number of piglets could access it at one time.

The previous studies concentrated on environmental enrichment to alleviate harmful social behaviour among pigs, but the causes of tail-biting are multifactorial (Van de Weerd, 2005) and its eradication relies on understanding them. Beattie *et al.* (2005) studied 159 pigs from birth to 7 weeks of age to identify the similarities among pigs that performed tail-biting behaviour. At 4 and 6 weeks of age, each pig was tested in a tail-chew test using an artificial tail model. Pigs that spent more time biting their pen-mates also spent longer chewing the ropes in the tail-chew test, suggesting that the same underlying predisposition was being measured. Overall, it was found that pigs that were biters showed lower growth rates and consequently were significantly lighter at weaning than others. The authors suggest that tail-biters have some nutritional deficiency that results in performance of foraging behaviour, expressed inappropriately in the commercial system as persistent chewing.

Conclusion

Enrichment with straw or paper is effective in minimising harmful social behaviours but the addition of a commercial device or ropes to the pen has proved far less effective. Since paper has been found to be a suitable enrichment substrate, further study is needed to compare its efficacy with that of straw. With further research into identifying pigs predisposed to tail-biting based on the model designed by Beattie *et al.* (2005), farmers could potentially identify those most at risk of harmful behaviours. Concentrating efforts on these individuals, either nutritionally or through enrichment, should improve the welfare of their pen-mates.

References

Beattie, V.E., Breuer, N.E., O'Connell, N.E., Sneddon, I.A., Mercer, J.T., Rance, K.A., Sutcliffe, M.E.M. and Edwards, S.A. (2005). Factors identifying pigs predisposed to tail biting. *Animal Science*. 80: 307-312.

Bracke, M.B.M. (2006). Expert opinion regarding environmental enrichment materials for pigs. *Animal Welfare*. 15: 67-70.

European Commission Directive 2001/93/EC amending directive 91/630/EEC laying down minimum standards for the protection of pigs. *Official Journal L316* (36-38). Accessed via http://ec.europa.eu/food/animal/welfare/references_en.htm 20 November 2006.

Fraser, D., Phillips, P.A., Thompson, B.K. and Tennessen, T. (1991). Effect of straw on the behaviour of growing pigs. *Applied Animal Behaviour Science*. 30: 307-318.

Haskell, M., Wemelsfeldor, F., Mendl, M.T., Calvert, S. and Lawrence, A.B. (1996). The effect of substrate-enriched and substrate-impooverished housing environments on the diversity of behaviour in pigs. *Behaviour*. 133: 741-761.

Lewis, E., Boyle, L.A., O'Doherty, J.V., Lynch, P.B. and Brophy, P. (2006). The effect of providing shredded paper or ropes to piglets in farrowing crates on their behaviour and health and the behaviour and health of their dams. *Applied Animal Behaviour Science*. 96: 1-17.

Van de Weerd, H.A., Docking, C.M., Day, J.E.L. and Edwards, S.A. (2005). The development of harmful social behaviour in pigs with intact tails and different enrichment backgrounds in two housing systems. *Animal Science*. 80: 289-298.

Vellenga, L., van Veen, H.M. and Hoogerbrugge, A. (1983). Mortality, morbidity and external injuries in piglets housed in two different housing systems. *Vet. Q.* 5:101-106.