

The Effects of Outdoor Housing and a High Fibre Diet on the Welfare of Intensively Produced Pigs.

Claire Connelly

Introduction

Of the animal production systems that attract welfare concerns, few have generated more worldwide interest than the intensive production of pigs. The traditional intensive production piggery that houses sows individually was originally designed to improve piglet survival and maximise the efficiency of land use and feed consumption, while also decreasing the incidence of aggression between sows. However strong public disapproval of the housing of sows in cramped and barren indoor stalls has led to extensive research into alternative housing methods.

Discussion

Such research has led to the introduction of group housing in many piggeries worldwide, including a total ban on individual stalls in the United Kingdom (Barnett et al., 2001). Other aspects of intensive pig production that are thought to improve welfare include outdoor housing and high fibre diets. Outdoor housing is believed to offer pigs greater environmental enrichment by providing them with the opportunity for natural behaviours such as rooting (Beattie et al., 1996). The traditional high energy, low fibre, carefully rationed diet provides 'low satiety' which is thought to influence stereotypic oral/nasal/facial behaviours commonly seen in intensively produced pigs and thought to be associated with stress and 'boredom' (Barnett et al., 2001).

A study by Olsen et al (2002) investigated the effect of extra roughage and outdoor shelter on seven replicates of 96 pigs that had access to indoor and outdoor environments from ten weeks of age. Two behavioural indicators (play and aggression) were analysed from 13 to 22 weeks of age to determine the influence of housing and dietary variables. The total frequency of aggression was lower in pigs that had access to roughage, with or without shelter, than pigs that had access to shelter but not roughage. The frequency of play was affected by the location of the pen, as pigs in south facing pens (which received more sun) that had shelter played more than those without shelter, while the sows in pens facing north played the same amount regardless of the provision of shelter. This prompted the authors to suggest that access to extra roughage and the opportunity to regulate body temperature by moving under a shelter improves pig welfare, but when considering this it must be acknowledged that play and aggression were the only behaviours monitored, and there was no analysis of common stereotypic behaviours.

McGlone and Fullwood (2001) examined the influence of housing and dietary fibre in pig welfare. The study used 42 gilts, housed during gestation in standard indoor metal crates. Of the 42 sows, 19 were on a control diet and 23 on a high fibre diet, and each of the two dietary groups consisted half of sows that had been reared in an indoor environment and half from an outdoor environment. The pregnant sows had their behaviour recorded and their plasma analysed at 30, 60 and 90 days of gestation for cortisol concentration, as a physiological measure of stress (Reed and McGlone, 2000). The study found that immune and reproductive measures were neither suppressed nor enhanced in sows reared either indoors or outdoors, as immune cell counts were similar and the number of pigs born live, the total litter weight and the number of piglets weaned were not significantly different. There were, however, differences in behaviour and the ability of the sows to adapt to the gestation crates. The sows reared outdoors showed increased behavioural signs of stress through 'sham-chewing', which involves chewing when not actually eating. The sows reared indoors that were also on a high fibre diet were also found to 'sham-chew' more frequently. The outdoor reared sows spent more time lying than those reared indoors, but by the end of the study period all 42 sows were found to show similar behaviours. Overall the

study found that plasma cortisol concentrations, and immune systems of the sows generally were not influenced by diet or rearing environment, which contradicts the findings of Olsen et al (2002).

In the study by Olsen et al (2002) no comparison was made between the welfare of pigs housed exclusively in indoor or outdoor environments, as each pig had access to both. McGlone and Fullwood (2001) did investigate this, but their pigs were in these environments only until maturity, at which time they were all moved indoors to gestation crates. A project by Johnson et al (2001) was conducted to compare 287 sows housed exclusively indoors or outdoors during breeding, gestation and farrowing. The welfare of the sows was measured using behavioural indicators (eg. standing, lying, playing, nursing) as well as the production indicator of piglet mortality. The research found that the indoor sows spent a greater proportion of time lying and drinking than the outdoor sows, and thus the outdoor sows were said to demonstrate 'a richer behavioural repertoire'. The outdoor piglets were observed to spend more time engaged in nursing and play activities than the piglets reared indoors. Other behaviours in both sows and piglets were found not to differ between the two treatments. Overall Johnson et al (2001) found that outdoor sows and piglets showed more diverse behaviour, but the different environments did not influence production parameters.

Conclusion

In conclusion, these studies have shown that an outdoor environment is more enriching for pigs, and if managed correctly, for example with the provision of shelter from the sun, encourages a more diverse behavioural repertoire that indicates an improvement in welfare. However the lack of evidence for an improvement in production will not encourage piggeries to make the transition from indoor to outdoor housing. It also appears important, due to the findings of McGlone and Fullwood (2001), that the rearing of piglets outdoors may have a negative effect on their welfare if they are to be housed indoors at maturity, which may be common if pigs are reared on one piggery and then sold to another. Due to the positive behavioural effect of roughage found by Olsen et al (2002) and the negligible effect of increased dietary fibre reported by Johnson et al (2001), access to loose roughage appears to give the greater welfare improvement of these two dietary changes. However more research is needed to strengthen the argument for using outdoor housing and increased roughage in the diet as a means of improving the welfare of intensively produced pigs.

References

- Barnett, J.L., Hemsworth, P.H., Cronin, G.M., Jongman, E.C. and Hutson, G.D. (2001) A review of the welfare issues for sows and piglets in relation to housing. *Aust Journal of Agricultural Research*, 52:1-28.
- Beattie, V.E., Walker, N. and Sneddon, I.A. (1996) An investigation of the effect of environmental enrichment and space allowance on the behaviour and production of growing pigs. *Applied Animal Behaviour Science*, 48:151-158.
- Johnson, A.K., Morrow-Tesch, J.L. and McGlone, J.J. (2001) Behaviour and performance of lactating sows and piglets reared indoors or outdoors. *Journal of Animal Science*, 79:2571-2579.
- McGlone, J.J. and Fullwood, S.D. (2001) Behaviour, reproduction, and immunity of crated pregnant gilts: Effects of high dietary fibre and rearing environment. *Journal of Animal Science*, 79:1466-1474.
- Olsen, A.W., Simonsen, H.B. and Dybkjaer, L. (2002) Effect of access to roughage and shelter on selected behavioural indicators of welfare in pigs housed in a complex environment. *Animal Welfare*, 11: 75-87.

Reed, S.N. and McGlone, J.J. (2000) Immune status of PIC Camborough-15 sows, 25% Meishan sows, and their offspring kept indoors and outdoors. *Journal of Animal Science*, 78:2561-2567.