

Short and long term consequences of age and group size in weaning on social development and interactions in pigs

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Introduction

In commercial piggeries, the formation of artificial groups and the mixing of unfamiliar piglets at weaning is a widespread practice. Pigs are kept in a closed space in which they are unable to withdraw from the group. Resources in the environment are most commonly limited and defensible, even when the amount of a certain resource should be sufficient (Anderson et al., 2004). Pigs by nature form social hierarchies and the competitive environment in piggeries often results in aggression, physical harm and social stress. Factors such as group size and weaning age have both long- and short-term welfare implications and this paper will review recent studies that have investigated their significance. Understanding the effects of the variables involved at weaning is a step towards ensuring that the system most beneficial for the animal and producer is adopted so that aggression is minimised and a more natural social environment prevails.

Discussion

Weaning early (<14 days) may be a cost-effective method to increase production, yet the impact of weaning age on social learning is unclear. A study by Yuan et al. (2004) attempted to clarify the effects of early weaning on agonistic behaviour. Piglets were divided into two groups: the first were weaned between 9-12 days of age, and the second were weaned between 21-23 days (conventional weaning age). At 9 weeks all the piglets were regrouped into four pens based on their weight. All agonistic reactions (scoring initiator, duration and outcome) were monitored for three days post-mixing and compared.

Results indicate that the early weaning of piglets leads to an acute increase in post-mixing aggression. Early weaned pigs initiated more fights that they did not win on the day of mixing but not on day two, indicating that a dominance hierarchy had been achieved. This increase in unsuccessfully initiated fights in early weaned pigs might be a reflection of impairments in their ability to recognise conspecifics or estimate an opponent's strength. Yuan et al. (2004) reports that play behaviour peaks between 2-6 weeks of age and is important to developing social behaviour in later life. Thus, weaning at 11 days of age might impair an animal's ability to recognise important social cues or alter the capability to properly act on them by reducing play behaviour.

It was difficult for Yuan et al. (2004) to obtain any physiological evidence of the effects of weaning because any difference would be masked by the more important current effects of diet change. This limitation was identified by Merlot et al. (2004) and was overcome by dissociating social reorganisation from weaning itself to evaluate the behavioural, endocrine and immune responses of piglets to mixing with unacquainted conspecifics. Four pairs of piglets 28 days old were each introduced into separate pens with four resident and socially stable littermates (control group). Salivary cortisol, behavioural activity and blood lymphocytic proliferation were monitored a day before mixing until 5 days post-mixing. Social mixing was perceived as a stressful event and had different consequences on individual pigs depending on whether the animal became the winner or loser. Pigs that obtained a high dominance position had lower cortisol concentrations than low-ranking pigs, 1 hour and 3 hours after mixing. That said, all results returned to basal values within 24 hours. There was no effect on blood lymphocyte proliferation. It was observed that the introduced piglets displayed an increase in lying behaviour when control piglets were active. Introduced piglets also showed a desynchronisation of activities compared with the control group. This is a demonstration of behavioural adaptation by introduced piglets to avoid conflicting situations by limiting the number of encounters.

The stress and abnormal behaviour displayed are not only a short-term welfare concern but, according to Yuan et al. (2004), increased cortisol concentration can disrupt the normal development of the hippocampus at an early age, which renders it more sensitive of the effects of acute stress. This compromises the pig's ability to retain information on the outcomes of previous agonistic encounters or impairs its ability to recognise a dominant animal, thus heightening post-mixing aggression. This impairment is particularly relevant when social hierarchies are expanded and become more complex.

Anderson et al. (2004) predicted that, with a larger group (>20), there will be a decrease in aggression and adoption of a non-aggressive coping style, marked by a passive behavioural response, caution in decision and a high behavioural flexibility to the changing environmental circumstances as described by Bolhuis et al. (in press). To test this theoretical model and determine the effects of group size weaned, unacquainted pigs were put into groups of 6, 12 and 24 for 12 hours. Video analysis was used to score each animal on a set of parameters, such as initiation, duration and outcome of fights, proportion of individuals not participating in fights, and total time spent fighting for each pig. The overall number of fights per pig in the group declined and fewer pigs got involved in fights with increasing group size; supporting the theoretical model. However, fights lasted longer in groups of 24 than in groups of six or 12 pigs. So, what is perceived to be a short-term benefit can have unknown long-term consequences. It is suggested that the probability of recouping the energetic costs of establishing the dyadic relationship with an individual is reduced as group size is increased and long-term dominance relationships suffer even if an ability to discriminate between group members and learn an individual's rank still exists (Turner and Edwards, 2004). Social hierarchy in a large group is more difficult to establish and maintain in the long term, which results in increased aggressive behaviour in pigs.

Conclusion

To improve pig welfare during stressful interventions, such as weaning, group dynamics in pigs should be further investigated with all factors put into perspective, particularly weaning age and group size. With appropriate application in commercial piggeries, weaning systems will provide an ideal social environment for both the individual and group, thus minimising aggression among conspecifics.

References

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