

Improving Piglet Welfare in Intensive Commercial Systems by ameliorating the Stress of Weaning

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Introduction

Under natural conditions, piglets are weaned gradually and the process is completed, on average, by 17 weeks of age. By contrast, in commercial pig husbandry weaning usually occurs abruptly between 3 and 7 weeks of age and involves a combination of potentially stressful events. These include separation from the sow, change in diet, transport, mixing with unfamiliar litters, crowding, introduction to a novel housing environment that often lacks environmental stimuli, and new immunological challenges. Weaning stress is thought to compromise piglet welfare by reducing weight gain, decreasing immunocompetence, and imposing digestive, thermoregulatory and behavioural disturbances that may lead to injury or death (Puppe *et al.*, 1997; Jensen, 2002; Merlot *et al.*, 2004). Recent studies have focused on the effects of weaning age, environmental enrichment and pre-weaning socialisation on the severity of weaning stress in piglets.

Discussion

Colson *et al.* (2006a) compared the short-term consequences of weaning litters of piglets at 21 and 28 days of age, under standard intensive conditions. They compared the behaviour, growth rate and urine glucocorticoid and catecholamine concentrations of these piglets throughout the first two weeks post-weaning. Compared with piglets weaned at 28 days of age, piglets weaned at 21 days displayed a more significant and prolonged decline in growth rate. They also showed a considerable decrease in urinary concentrations of cortisone and noradrenaline, due to a reduction in food intake in response to the abrupt change in diet. Behavioural disturbances (belly-nosing, oral stereotypies, aggression and increased resting and group cohesion) were observed in both the younger and older weaned piglets. The increase in resting behaviour and group cohesion was more prolonged in the younger piglets, suggesting that these piglets were in a state of chronic stress and impaired thermoregulation. Conversely, more aggressive behaviour was displayed by the piglets weaned at 28 days than those weaned at 21 days of age.

From these results, Colson *et al.* (2006a) concluded that weaning piglets at 21 days of age has a more negative impact upon piglet health than weaning at 28 days. These findings complement other research into the effects of weaning even younger piglets. Those weaned at between 6 and 14 days of age show an even greater decline in food intake, growth rate and immunocompetence (Hay *et al.*, 2001; Niekamp *et al.*, 2007). Further research is required to identify the weaning age for pigs that is optimal to their welfare (Colson *et al.*, 2006a).

As demonstrated by Colson *et al.* (2006a), behavioural disturbances occur among most piglets at weaning in commercial systems, regardless of the age at which weaning occurs. These behavioural disturbances have been found to be reliable indicators of stress induced by the events that occur at weaning (Dybkjær, 1992). Dudink *et al.* (2006) investigated the effects of environmental enrichment upon the post-weaning behaviour of piglets. Before weaning at 31 days of age, piglets were subjected to Pavlovian conditioning, which involved pairing a sound cue (conditioned stimulus) with the presentation of environmental enrichment (unconditioned stimulus). By increasing the time interval between the onset of the sound cue and the delivery of the enrichment, anticipatory behaviour was developed. Both the cue and enrichment continued to be delivered daily throughout weaning. Piglets that were conditioned to the 'announcement' of enrichment, compared with those given enrichment alone, displayed less agonistic behaviour as well as a greater amount of play behaviour after weaning. Play is recognised as a positive indicator of animal welfare (Dybkjær, 1992).

The authors explained these findings by linking the anticipation of enrichment to the activation of the neural reward system, which promotes the performance of play behaviour. However, the provision of enrichment did not entirely prevent the occurrence of aggressive behaviour, nor subsequent injury. The authors therefore warned that the use of environmental enrichment alone should not be relied upon to reduce weaning stress.

A more profound reduction in aggressive behaviour among weaned piglets was achieved by Hessel *et al.* (2006) when they investigated the impacts of socialising piglets prior to weaning. Piglets from three different litters were socialised together at 12 days of age, and subsequently weaned together at 28 days. Under natural conditions, piglets are able to socialise with piglets from other litters from 10 days of age, with little aggression. However, this does not occur in modern pig husbandry (Puppe *et al.*, 1997; Gonyou, 2001). Compared with unsocialised piglets, the socialised piglets gained more weight in the two weeks following weaning. Socialised piglets also displayed fewer agonistic behaviours (biting, head pushing or knocking) and less avoidance behaviour toward each other during the first two days after weaning. Unsocialised piglets usually take three days to develop avoidance behaviours that allow them to behaviourally adapt to the stress of mixing with unfamiliar litters (Merlot *et al.*, 2004). Hessel *et al.* (2006) assumed that socialising piglets during the nursing period afforded them the opportunity to peacefully establish a social hierarchy prior to weaning, thereby decreasing the likelihood of aggressive interactions at weaning. D'Eath (2005) found similar results in a study of piglets that were socialised before being weaned at 50 days of age. However, further research is required to elucidate whether the same effects are applicable to groups of more than three litters.

In the past it has also been found that grouping piglets by sex, mixing piglets of heterogeneous weights, and using sedatives and pheromones during weaning, all reduce the incidence of aggressive behaviour (Jensen, 2002; Colson *et al.*, 2006b). However, the use of announcement of enrichment and early socialisation could both be applied with much less cost and management effort.

Conclusion

Piglet welfare during weaning in intensive systems could be substantially improved by increasing the age of weaning, socialising piglets with other litters prior to weaning, and conditioning piglets to anticipate environmental enrichment. Concurrent use of these strategies would be a cost-effective way to reduce stress and injury levels of piglets during weaning, and to increase liveweight gain. However, further research is needed into the optimal age for weaning, and the application of pre-weaning socialisation to larger groups of litters.

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