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Socialising piglets in lactation positively affects their post-weaning behaviour

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ABSTRACT

Although commercial farrowing sheds keep individual litters separated, previous studies have suggested that housing systems that allow socialisation of piglets pre-weaning can reduce aggression after weaning. This study tested whether pigs socialised with non-litter mates pre-weaning would show less aggression during mixing at weaning (when piglets are taken from their sows and mixed in group housing), and whether socialisation influenced the time budgets or behavioural expression of piglets at weaning. In total, 353 piglets were followed from birth through to one week after weaning. Piglets from 24 sows were allowed to socialise in groups of four litters ('socialised' treatment group) from 10 d of age; litters from nine sows were followed as controls. Socialised piglets were monitored to determine the prevalence of cross-suckling. Body weight was recorded at birth, prior to weaning and one week after weaning. Continuous video footage was collected for 1.5 days after weaning for behavioural analyses. There was no difference in the body weight of socialised pigs compared to control pigs at weaning or one week after weaning. Quantitative scoring of behaviour revealed no significant difference in aggression displayed between treatment groups or between the sexes; however, compared with overall averages, a greater proportion of socialised males spent time lying (57% of time compared with an average of 43% for the other sex-treatment groups, $P < 0.001$; but less eating/drinking 4% cf. average 8%, $P < 0.001$), and a greater proportion of socialised females were investigating (17% cf. average 12%, $P < 0.001$ with less lying 40% cf. 48%, $P < 0.001$). Qualitative behavioural assessment (QBA) was used to assess the body language of pigs during an active period (the middle of the day after weaning). Observers reached consensus in regard to their assessments of pig behavioural expression ($P < 0.001$). Two main dimensions of behavioural expression were identified, which accounted for 41% and 19% of the correlation between pigs. There were significant socialisation treatment effect ($P = 0.002$ and $P = 0.007$) on both dimensions, with socialised pigs more likely to be described as 'sleepy'/'tired' or 'content'/'relaxed' than control pigs (described as more 'active'/'curious' or 'aggressive'/'dominant'). Because socialising piglets had no effect on body weight pre-weaning, and there was a low occurrence of cross-suckling ($2.9 \pm 6.5\%$ of piglets recorded suckling), socialisation was not disadvantageous. On the contrary, the behavioural difference at weaning suggests socialising piglets may be beneficial from a welfare perspective.

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1. Introduction

Under commercial conditions, young pigs removed from their dams at weaning are generally sorted by weight and sex and then placed into pens in dedicated nursery facilities. Unfortunately, the mixing of non-littermates at weaning causes aggression that is of welfare concern (Parratt et al., 2006). Increased fighting due to mixing (Ewbank and Bryant, 1972) may lead to wounds, infection and abscesses (Teague and Grifo, 1961), and coupled with the challenges of dietary change at weaning, there is generally decreased disease resistance, growth performance as well as increased mortality recorded at weaning (Gross, 1972; Gross and Colmano, 1969). Increased fighting also contributes to reduced post-weaning feed intake through reduced time spent eating (Friend et al., 1983; but see Sherritt et al., 1974).

A number of methods have been tested to reduce aggression when mixing unfamiliar pigs. For example, Pluske and Williams (1996) showed that the psychotropic drug amperozide reduced the incidence of aggressive behaviours following mixing of newly-weaned pigs, while lithium added to the diet reduced aggressive behaviours (but also caused vomiting and reduced feed intake, McGlone et al., 1980). A review of the use of pheromones, masking odours and tranquilisers found no notable success of any of these methods (Petherick and Blackshaw, 1987). Increasing dietary tryptophan levels to modulate brain serotonin levels, and hence behaviour, did not reduce stress responses in pigs (Li et al., 2006), and decreased shed illumination (which reduced cannibalism in broiler chickens, Christison et al., 1995), failed to reduce aggression in pigs (Dechamps and Nicks, 1989).

An alternative approach to reduce fighting at weaning is to familiarise piglets with non-litter mates pre-weaning ('socialising'). Socialising piglets has been reported to reduce agonistic behaviour at weaning under intensive pork production conditions (Pluske and Williams, 1996; Weary et al., 2002). Piglets may be more predisposed to accept non-familiar piglets at a younger age (Pitts et al., 2000), since it is during this period of socialisation after leaving the nest that piglets learn to form social relationships through non-aggressive and playful interactions (Petersen et al., 1989). Pre-weaning is clearly an important time for piglets to develop behavioural flexibility and therefore the capacity to adapt to new challenges (Cox and Cooper, 2001), and hence is a time when piglets establish behavioural responses which they later rely on in life (Fagan, 1981). Additionally, although piglets still fight when socialised pre-weaning, fighting is of shorter duration (Pitts et al., 2000) and injuries are less severe because the piglets are smaller (Jensen et al., 1994). Pre-weaning socialisation therefore allows piglets to develop important social skills (Chaloupková et al., 2007) that can not only improve the young pigs' abilities to adapt to the post-weaning environment (Cox and Cooper, 2001), but also benefit them during the grower/finisher period (D'Eath, 2005; Hillmann et al., 2003; Kutzer et al., 2009).

Socialising can also increase feed consumption by piglets, both before and after weaning (Weary et al., 2002), which may lead to increased weight gain pre- and post-weaning (but see Rantzer et al., 1995; Weary et al., 2002). Pre-weaning socialisation therefore potentially has production benefits in addition to reducing the chance of injury at weaning (Pitts et al., 2000). Nevertheless, one of the concerns regarding allowing mixing of suckling piglets is the incidence of cross-suckling and competitive exclusion of subordinate piglets. Although it can be considered a natural phenomenon (Maletinska and Spinka, 2001), cross-suckling is generally avoided under industry conditions due to fears of suckling disruption (preventing some piglets from suckling) and potential injury to both the sow and the piglets. Reduced milk intake and weight gain in the presence of cross-suckling has been reported in some studies (Algers et al., 1990; Pedersen et al., 1998), while cross-suckling may also lead to increased fighting for udder position which can lead to teat and udder damage (Brown et al., 2005; Olsen et al., 1998). Mixing and cross-suckling can also agitate the sow (Pedersen et al., 1998). It is understood that sows can distinguish between their own and alien piglets by odour (Horrell and Hodgson, 1992); in a multi-suckling system a sow has limited possibilities of allowing only her own piglets to suckle and not alien piglets, and as a result she may terminate suckling bouts (e.g. by standing) where alien piglets are present (Pedersen et al., 1998). Depending on the housing system, anecdotal reports suggest that some sows can become aggressive and attack the alien piglets, or withhold and/or terminate suckling bouts for anything up to a day or more, unless sedated (Blackshaw, 1986; Harper, 2001; White, 2013). However, published studies suggest that any disturbances to lactation only last for a few hours (Jensen, 1986) or days (Weary et al., 2002) and have no follow-on effects on growth rates (Maletinska and Spinka, 2001; Wattanakul et al., 1997). It should also be noted that not all studies on multi-suckling systems observed cross-suckling (Kutzer et al., 2009), and giving the piglets sufficient time to bond to their own sow (including recognising her lactation call) and establish a teat order may reduce the incidence of cross-suckling (D'Eath, 2005; Newberry and Wood-Gush, 1985).

The aims of the present study were to investigate the effects of pre-weaning socialisation on behaviour pre-weaning (cross-suckling and body weight gain), as well as post-weaning observations (time budgets for 1.5 days after weaning, and assessment of behavioural expression of pigs through qualitative behavioural assessment; QBA).

2. Methods

2.1. Animals and experimental design

This study was carried out at a large commercial piggery in Western Australia under approval of the Animal Ethics Committee at Murdoch University (permit number R2412/11) and the farm owners/managers (who wish to remain anonymous). We examined the effects of pre-weaning socialisation on behaviour during mixing at weaning, which was achieved without interfering with the general piglet or sow management practices under the current farrowing system used at the piggery. At the conclusion of the study, the pigs continued on within the farm's grower/finisher facility.