

Achieving Social Cohesion within Groups of Pigs Coping with Stress

An insight into the behavioural repertoire of pigs and ways of reducing social tension and aggression among them.

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Introduction

During the intensive production cycle, pigs may encounter unfamiliar conspecifics and environments several times (Camerlink *et al.*, 2014a). With minimal avoidance space, the outcome is often social conflict and regrouping aggression as new hierarchies are established (Greenwood *et al.*, 2014). Aggression remains a persistent welfare issue in commercial pig farming despite decades of research on social conflict, suggesting the need for an alternative approach to complex behavioural issues (Camerlink *et al.*, 2014a). Group dynamics are of particular relevance in sows, where group housing may help alleviate stress during gestation (Zhou *et al.*, 2014). Stress can be defined as a physiological and behavioural response to an event the individual perceives as a threat to its homeostasis (Greenwood *et al.*, 2014). This paper discusses the role of affiliative behaviours in promoting social cohesion and reducing stress, as well as the links between indirect genetic effects and aggression.

Discussion

Indirect genetic effects (IGEs) occur when genes expressed in an individual influence the phenotypic traits of a group; some have been found to affect growth rate in domestic pigs (Camerlink *et al.*, 2014b). Camerlink *et al.* (2014b) aimed to determine whether selection for indirect genetic effects on growth (IGEg) alters behaviour in pigs. Sows and boars were selected based on estimated breeding value and mated within their group, high or low IGEg. First-generation offspring were then studied over five batches (n=96 in each batch), separated into either barren or straw-enriched environments to assess consistency in changes due to selection for IGEg.

Biting behaviour in pigs has been related to frustration, stress and fearfulness (Zupan *et al.*, 2012). High IGEg pigs were involved in fewer occurrences of aggressive ear and tail biting, suggesting these individuals were better at establishing dominance relationships or coping with stressful situations. Pigs in enriched pens were more active and exhibited fewer biting behaviours than pigs in barren pens, instead dedicating more time to play, comfort behaviour and pen-nosing. This reduced incidence of pen-mate-directed behaviours implies that straw may be effective in redirecting biting behaviour to the environment, while selection for IGEg may reduce the individual's disposition to bite. An individual carrying genes making it competitive may cause injuries and reduce the growth rate of its group members by increased aberrant behaviour. Though the mechanisms underlying IGEs are only just being discovered, this study suggests there is potential for selection for IGEg to alter a range of behaviours and improve social interactions within groups, simultaneously improving both productivity and welfare. However, the consequences are largely unknown. With reduced occurrences of harmful biting behaviour, other behaviours may emerge over generations in relation to selection for IGEg.

In commercial pig farming one situation that often results in aggressive interactions, skin injuries and increased stress is regrouping (Greenwood *et al.*, 2014). As part of the above trial, a further study by Camerlink *et al.* (2014a) investigated the role of aggressive and affiliative behaviour, such as social grooming and body contact, in spatial integration during social conflict. At age 9 weeks, pigs (n=384) originally in groups of six were regrouped, with pairs relocated into new pens of six with two unfamiliar pairs. After 24 hours, pairs were returned to their initial pen, and the number of fresh skin lesions counted. Blood samples taken the week before the regrouping test and three days after revealed increased plasma haptoglobin concentrations, presumably correlating with stress levels. From video footage, pigs showed clear preferences for a familiar pig, lying much closer (125+/-2cm) than to unfamiliar conspecifics (158cm+/-2cm) and having greater direct body contact for up to 24 hours, though these behaviours could only be observed on a pair level.

The data were summarised and analysed against inter-individual distances to elicit combinations of variables that describe sociality and involvement in aggression. A high factor 1 score described pigs found to hamper social cohesion, having many lesions, high bodyweight, inactivity and minimal social nosing. Conversely, active pigs exhibiting much social nosing, few lesions and lower bodyweight were more prone to approach

both unfamiliar and familiar pigs. Thus improving spatial integration between unfamiliar conspecifics does not necessarily require less-aggressive animals, but may depend on how rapidly dominance relationships can be established. Groups that mix well are the key to improving animal welfare (Camerlink *et al.*, 2014a). By determining which specific characteristics in behaviour and physiology contribute most to small inter-individual distances and selecting for those, social cohesion may be promoted.

Social conflict and stress after regrouping are particularly relevant to sow welfare (Greenwood *et al.*, 2014). Housing sows in narrow gestation stalls has attracted considerable media attention recently, with group-housing systems being debated as an alternative. Zhou *et al.* (2014) aimed to determine the advantages and disadvantages of group housing using 28 primiparous Large White sows of similar age, randomly delegated to stalls or groups of four. Observations of both agonistic and stereotypic behaviours, such as sham chewing, were more frequent in stall-housed sows, where conflicts may have been more difficult to resolve. In contrast, group housing allows more freedom to express non-agonistic behaviours promoting social cohesion. Given the small sample size, conclusions on sow reproductive performance could not be reached but significantly higher salivary cortisol concentrations, correlating to increased stress, were found in group-housed sows. The likely cause was regrouping stress, as similar trends have been reported in previous studies where aggression rapidly declined after mixing and became stable after 7 days (Arey, 1999). Though regrouping situations are unavoidable in group-housing systems, methods to reduce aggression can focus on minimising conflict while dominance hierarchies are being established (Greenwood *et al.*, 2014).

Conclusion

A more integrated approach towards analysing the behavioural repertoire of pigs may help us understand and mitigate the social stress of situations such as regrouping. Sustainable welfare improvements may ultimately be achieved by improving social cohesion, potentially by selection for IGEg to alter behavioural characteristics, or identifying and removing problem individuals. Prompt establishment of dominance relationships may be key to reducing social tension, which does not equate to reducing aggression, but is possibly just as important for welfare.

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