

Environmental Enrichment for Pigs in Intensive Housing Systems

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Introduction

Intensive (indoor) housing compromises the welfare of pigs of all ages. Pigs are often housed in barren environments, with concrete or slatted flooring and no substrate with which to perform natural, evolved behaviours, such as rooting and foraging. Inability to express highly motivated exploratory behaviours results in adverse behaviours, such as ear- and tail-biting (Van de Weerd *et al.*, 2005). Environmental enrichment can improve welfare in barren environments and has been shown to reduce abnormal and potentially harmful behaviour (Arey, 1993). The following three studies together examine the effectiveness of various substrates, effects of habituation, age influences, and behaviour synchronisation.

Discussion

Straw, peat, sawdust and mushroom compost provide successful enrichment for pigs (Beattie *et al.*, 1995). However, it is often not economically or practically viable to provide such substrates in fully-slatted systems with liquid manure handling facilities (Scott *et al.*, 2009). A recent study by Scott *et al.* (2009) observed the behaviour of 1024 finisher pigs provided with straw bedding as compared with a plastic toy and evaluated methods of enrichment presentation. Pigs were housed in either fully-slatted or straw-bedded pens, with half in each system receiving a plastic toy (two rigid pipes) hung at pig head level. The remaining fully-slatted pens were given the same toy loose on the floor. Hanging toys remained clean and always accessible, while free toys were easily soiled and not always available.

Across both housing systems, straw-directed behaviours (chewing, rooting, nosing) were significantly more frequent than toy-directed behaviour (Scott *et al.*, 2009). Where straw was not provided, the hanging toy was manipulated significantly more than the loose toy. Toy type did not significantly affect behaviour directed at pen-mates or pen fixtures, but pigs provided with straw directed less attention to other pigs and the pen (Scott *et al.*, 2009). Consequently, there were fewer incidents of ear- and tail-biting, resulting in dramatic improvements in welfare. Neither type of toy was able to provide as high a level of occupation as that observed with straw. However, under practical restrictions imposed by housing facilities, a hanging toy provides more enrichment than one presented loose on the floor (Scott *et al.*, 2009; Trickett *et al.*, 2009).

Trickett *et al.* (2009) assessed the effects of habituation to two contrasting objects, a suspended rope and a loose wood block, on the behaviour of weaner pigs. To determine whether novelty had any affect, objects were alternated and provided during restricted periods. Treatment groups were formed from 250 weaner pigs, housed in fully-slatted pens. Each treatment group had: continuous access to two suspended ropes; continuous access to a loose wood block; weekly alternations of the two objects; or simultaneous access to both objects.

Pigs preferred suspended rope, as it was less likely to be soiled and more easily manipulated than loose wood (Scott *et al.*, 2009; Trickett *et al.*, 2009). Like Scott *et al.* (2009), Trickett *et al.* (2009) reported that providing objects that gave pigs a better outlet for exploratory behaviour resulted in fewer adverse behaviours directed at pen-mates and pen fixtures.

Rope and wood interaction decreased within the first week in all treatments, demonstrating that significant habituation occurred (Trickett *et al.*, 2009). The introduction of a novel object at any time increased object interaction. However, when objects were presented for a second time after a week's break, interaction was always lower than initially observed (Trickett *et al.*, 2009). Stimulus properties, together with presentation and degree of novelty, determine the effectiveness of enrichment objects (Scott *et al.*, 2009; Trickett *et al.*, 2009). Rotation of

objects increased novelty, but habituation still occurred over the 4-week period (Trickett *et al.*, 2009).

In contrast to Scott *et al.* (2009), Trickett *et al.* (2009) concluded that suspended rope occupied pigs for almost as much time as straw. This apparent contradiction can be attributed to the physical characteristics of each object. Being more destructible and manipulable than plastic piping, rope has previously been shown to stimulate exploratory behaviour in pigs more effectively (Studnitz *et al.*, 2007). Trickett *et al.*, (2009) suggested that rope could be provided as a practical alternative enrichment for pigs in fully-slatted housing.

The decrease in object interaction over time observed by Trickett *et al.* (2009) may be partly due to increased age of their subjects, as suggested by recent findings. Docking *et al.* (2008) concluded that age significantly affected object interaction time, with growers interacting less with certain objects after 4 days than weaners. This study examined the influence of age (3 weeks, 5 weeks, and 13 weeks of age) on extent and synchrony of use, of 10 various enrichment objects. Replicate groups of sucklers, weaners and growers were formed from 270 pigs of different ages. Pigs were housed without bedding and presented with 10 diverse novel objects simultaneously. Objects (including compost, straw, string, weights) had a wide range of physical attributes and were either renewed daily, if necessary, or remained in the pen.

Growers spent significantly more time inactive than weaners. When active, growers interacted significantly more with the objects than sucklers (Docking *et al.*, 2008). Habituation due to loss of novelty was more rapid in growers than in weaners or sucklers, with object interaction decreasing significantly over the 5 days (Docking *et al.*, 2008). Pigs of different ages showed varied patterns of object use. However, all groups used compost, straw and hanging string the most. These findings are similar to those of Trickett *et al.* (2009), who observed that these objects showed the least habituation due to their daily novelty and physical properties. Additionally, the degree of synchronisation of object-directed behaviour increased with age (Docking *et al.*, 2008). Therefore, the potential for social competition leading to aggressive behaviour must be considered when novel objects are provided. Further research is required to determine a functional ratio of pigs to objects.

Conclusion

Many factors must be considered when providing environmental enrichment to pigs housed in intensive systems. Providing enrichment suitable for age and group size, with desirable physical characteristics and a degree of novelty, can significantly improve pig welfare.

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