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Review article

The effects of environmental enrichment on the behaviour of suckling piglets and lactating sows: A review

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ABSTRACT

The aim of this paper is to review the existing literature concerning environmental enrichment for suckling piglets and lactating sows and the effects on behaviour and mortality. Most research considering environmental enrichment still focuses on weaner, grower and finisher pigs. However the European Union Directive 2001/93/EC states that all pigs should have access to a sufficient quantity of material to enable proper investigation and manipulation activities. Fortunately, research on environmental enrichment and alternative housing for piglets and sows is growing and results show important beneficial effects on welfare of both piglets and sows, by providing opportunities to engage in explorative behaviour, nest-building and social interactions and improving maternal responses. Social enrichment, increased space allowance and/or straw provide promising results on welfare but are not always practical to implicate and bring forth other potential risks and concerns. Therefore, it would also be interesting to further examine the potential of other types of enrichment, such as objects or sensory enrichment (e.g. pheromones), as possible applications and their effects on piglet and sow welfare. Other aspects which need more clarification are the relation between environmental enrichment during the farrowing period and weaning age and the relation between painful procedures, such as castration and tail docking, and environmental enrichment on the behaviour of piglets.

Contents

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1. Introduction

Modern animal production systems often implicate the use of simple and barren housing conditions in favour of economic efficiency. However, these captive environments rarely meet the specific behavioural needs of the animal and can compromise animal welfare (Wechsler, 2007). Environmental enrichment is described by Newberry (1995) as the modification of a captive environment which leads to an improvement in the biological functioning of animals. The term 'enrichment' implies that an alteration of the environment effectively benefits the animal. Therefore, the term environmental enrichment should only be used in situations where it notably leads to an improvement in the animal's life (Newberry, 1995). The outcome of an environmental change might not always be measured objectively. Although good health, physical fitness and the absence of pain are fundamental to positive welfare, the benefits of environmental enrichment to the well-being of animals reach further than proper biological functioning. Even without clear evidence of improved biological functioning, such as better reproduction results or a longer lifespan, environmental enrichment still serves an important function by relieving psychological and emotional needs (Poole, 1992). Animals can have strong motivations to perform certain behaviour patterns and the inability to do so, by lack of opportunity or stimuli, can lead to abnormal behaviour and signs of distress and boredom (Poole, 1992; Wemelsfelder, 1984). Environmental enrichment can improve animal welfare by creating behavioural opportunities that allow the animal to express control over its environment and to express key behavioural elements such as foraging and exploring (Van de Weerd et al., 2006). Many studies have found a positive effect of environmental enrichment on brain weight and activity (Rosenzweig et al., 1972), learning abilities (Jansen et al., 2009; Krause et al., 2006; Peña et al., 2009; Rosenzweig and Bennett, 1996; Sneddon et al., 2000) and memory (Bruel-Jungerman et al., 2005; de Jong et al., 2000). Environmental enrichment has also been shown to aid in the recovery from brain injury (Will et al., 2004). Additionally, much research has been done, trying to determine affective states in animals and gaining a better understanding of their emotions (e.g. see review by Boissy et al., 2007). The assessment of welfare from a scientific point of view is no longer limited to the absence of negative experiences but also pays attention to promoting positive ones (e.g. Boissy et al., 2007; Yeates and Main, 2008).

In pig farming, the animals are often confined to very barren pens with little or no opportunity to express their behavioural needs. Pigs are highly motivated to perform exploratory behaviour such as rooting which provides them with information about their surroundings and its resources (Studnitz et al., 2007). The lack of proper stimuli to express this behaviour can lead to abnormalities of physiology and behaviour such as stereotypies (Broom, 1991) or harmful redirected behaviour towards pen mates (Fraser et al., 1991; Schrøder-Petersen and Simonsen, 2001; Van de Weerd et al., 2005). Beneficial environmental enrichment holds a biological relevance to the animal (Würbel and Garner, 2007). A study by Van de Weerd et al. (2003) showed that attractive environmental enrichment for pigs possesses qualities that reflect their motivation to explore and forage. Novelty is another important aspect to consider when providing enrichment to pigs. Enrichment that is not variable or complex enough will soon lead to habituation and it will lose its function (Blackshaw et al., 1997; Wood-Gush and Vestergaard, 1991). The European Union (EU) Directive 2001/93/EC states that 'all pigs must have permanent access to a sufficient quantity of material to enable proper investigation and manipulation activities, such as straw, hay, wood, sawdust, mushroom compost, peat or a mixture of such, which does not compromise the animal's health'. Though examples of possible enrichment are given, the Directive