Determining Effective Enrichments for Group Housed Sows

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SUMMARY

Effective enrichments have been shown to reduce aggression and injuries, and can be an effective tool to improve the management of group-housed sows. This project set out to identify the most effective forms of enrichment based on attractiveness, durability, and sustainability of a range of enrichment objects. The objects identified as most effective within this study will be used in a future enrichment study.

Groups of 28 multiparous sows and gilts were housed in walk in/lock in stalls with a partially slatted loafing area. Five treatments were examined over five days, including: 1) a horizontal piece of wood (4"x4"), suspended on chains between two posts; 2) a block of wood (18"x 2"x 4"), attached to a chain allowing the block to rest at a 45^0 angle; 3) three items (rope, chain, and wood block) hung together on a chain; 4) straw provided in two metal racks; and 5) straw placed on the solid floor at 300g/day/sow.

When looking at the overall interaction, the percentage of sows interacting with enrichment items on day 1 far exceeded those on days 3 and 5. This habituation response was expected. There was an increase in sows lying down throughout the five day treatment with the swing, straw on the floor, and straw in a rack treatment groups. Ranking the enrichment treatments according to durability, safety, and sow attractiveness resulted in the following ratings (first to last): straw on the floor, straw in a rack, three-item enrichment, and the block of wood. Based on these results, the straw, cotton rope and the wooden block treatments will be further examined in the next phase of the study.

INTRODUCTION

The provision of enrichment is recognized as an important environmental modification to improve the biological functioning and well-being of animals (Newberry, 1995). It is also a requirement for pigs reared in Canada as defined within the revised Canadian Code of Practice for Pigs. For pigs, enrichment provides an outlet for their highly motivated exploratory behavior, and promotes positive social interactions. Failure to provide enrichment has been linked to the development of adverse behaviours, most notably tail-biting in grow-finish pigs; and in sows, increased aggression and stereotypic behaviours (Van de Weerd, 2006; Wittaker et al., 1999). Studies have shown that sows value access to enrichment in their home pen (Elmore et al., 2011), and its use in group housing systems has the potential to improve welfare by reducing aggression, stimulating exercise and increasing measures of positive affect (Dudnik et al., 2006).

"Viable enrichments were durable, with little to no maintenance required after 1 week of use. "

Development of environmental enrichments that can be effectively used in group sow housing systems (on slatted or partially slatted floors) will provide important management tools to help producers manage sows in groups. Specifically, effective enrichment will help to reduce aggression and injuries, and promote sow well-being through expression of rooting and exploratory behaviours. Sows may also be more fit at farrowing, giving potential for shorter birthing intervals, and fewer laid-on piglets. Addressing the challenge of suitable and effective environmental enrichment for slatted-floor systems

Figure 1. Sows at the Prairie Swine Centre interacting with the block of wood enrichment.

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will provide producers with useful tools to meet or exceed future codes, and achieve the intended social and physical benefits of enrichment, such as improved fitness and reduced culling due to aggression and injuries.

MATERIALS AND METHODS

Three groups of 28 multiparous sows and gilts were housed in walk in/lock in stalls with fully slatted group housing. In each group, five treatments were examined over five days, including: 1) Swing: a horizontal piece of wood (4'x 2"), suspended on chains between two posts; 2) Block of wood (18"x 2"x 4"): softwood attached to a chain allowing the block to rest at a 450 angle on the floor; 3) Three items (rope, chain, and wood block): hung together on a chain; 4) Straw provided in two metal racks; and 5) Straw on the floor at 300g/day/sow delivered an hour after feeding.

Initial sow enrichment interactions were observed at two minute intervals for one hour by live observation while sows were locked out of the stalls. Enrichment interaction and activity were recorded using time lapse photos at 10 minute intervals for 8hrs/day on days 1, 3 and 5. Based on results from the first replicate, the swing device was removed from the study at one week as it was deemed a hazard and unsafe for the sows.

Based on the results of this initial enrichment assessment, a full study will be carried out on approximately 224 sows (28 sows x 8 reps) at PSC, and 120 sows (22 sows x 5 reps) at the University of Manitoba. Each group of sows will be exposed to a series of treatments of 12 days each. These trials are currently on-going at Prairie Swine Centre Inc. and the University of Manitoba.

RESULTS AND DISCUSSIONS

Enrichment interactions on days 1, 3, and 5 are shown in Figure 2. Straw on the floor was the most popular, followed by straw in a rack, the 3-piece item, the swing, and the wooden block. The percentage of sows interacting with enrichment items on day 1 far exceeded those on days 3 and 5. This can be attributed to the 'novelty' of the enrichment items, and the reduced interaction with objects on subsequent days is known as habituation. Interactions with the swing device decreased significantly over the five day study, and sows were notably apprehensive of it. The percentage of interacting sows also decreased for the 3-piece item, straw on the floor, and straw in a rack. Average use of the wooden block increased slightly from day 3 to day 5.

Figure 3 shows percentage of sows that were present in the solid area of the T pen, which is an indication of the overall attractiveness of the enrichment. Day 1 had the highest percentage of sows in the solid area for each treatment. The percentage of sows present increased from day 3 to day 5 in every treatment except for the 3-piece item.

Sow postures in the solid group space were also examined as an estimate of enrichment attractiveness. Observations focused on the average percentage of sows lying down (Figure 4), as lying behaviour can be interpreted as an indicator of satiety and comfort. It is important to note that sows were categorized as either interacting with the enrichment or lying down, which explains why there was the lowest percentage of sows lying down on day 1. There was an increase of sows lying down throughout the five day treatment with the swing, straw on the floor, and straw in a rack treatment groups. Straw is known to be a valuable enrichment item, so the increase in sows out of their crates and lying down in the straw treatments was an expected result. The percentage of sows lying down when given the swing increased dramatically over day 1, 3, and 5. This was likely due to negative feedback from the device as the enrichment swung in an erratic manner and was observed to swing against their legs. This would explain the decline in interactions over time, shown in Figure 2.

CONCLUSIONS

It was concluded that ranking of enrichment treatments in terms of durability, safety, and sow attractiveness were as follows: 1) Straw on the floor, 2) Straw in a rack, 3) Three item enrichment, and 4) the Block of wood. The swing (horizontal wood) treatment was removed from the study due to it being a safety hazard to sows. No sows were injured, but the necessary precaution was taken. Each of the viable enrichments was durable, with little to no maintenance required after 1 week of use.

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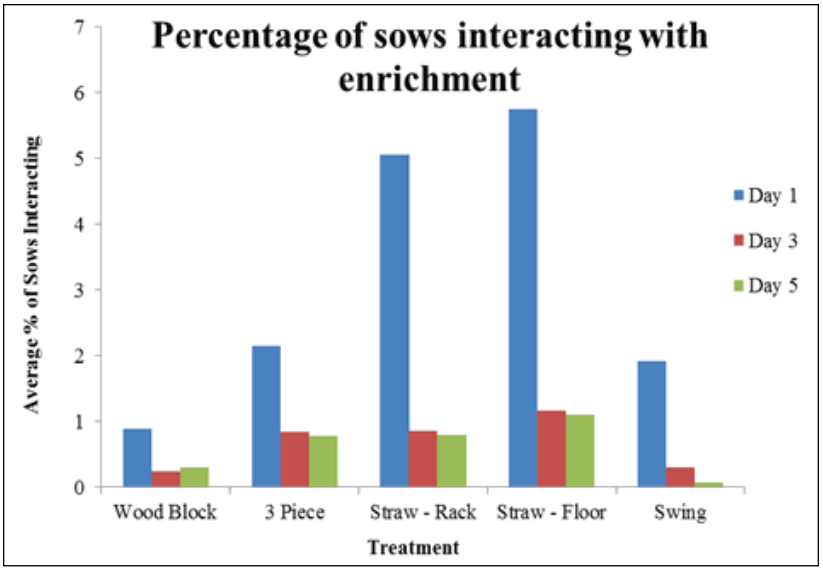

Figure 2. The percentage of sows interacting with enrichment over an 8 hr period, on days 1, 3, and 5

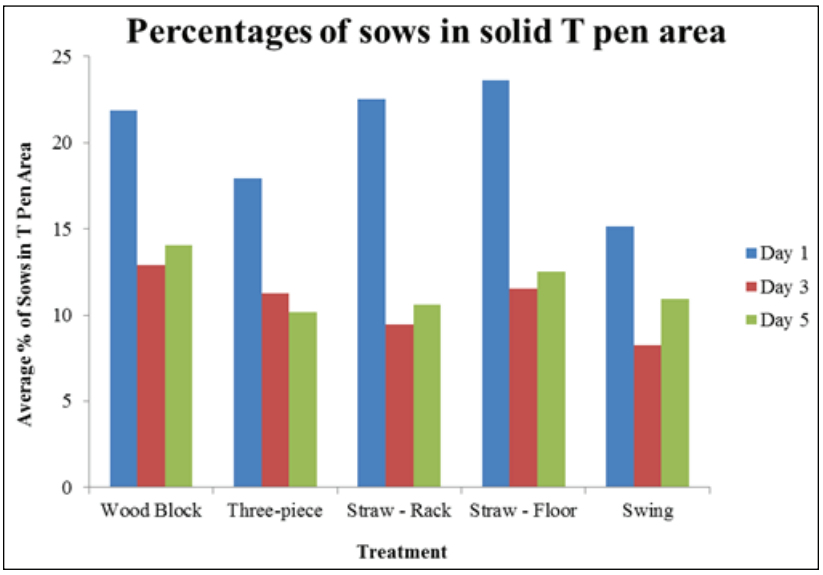

Figure 3. The percentage of total sows in the solid T pen area on days 1, 3, and 5

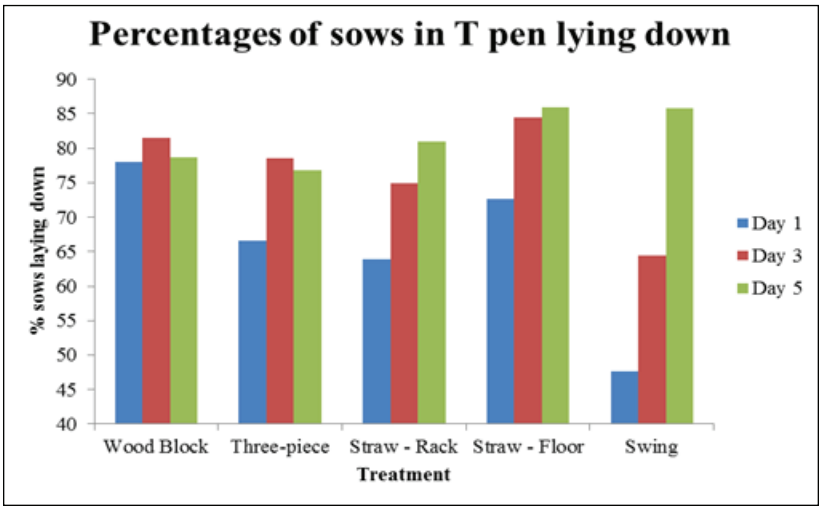

Figure 4. The percentage of sows in the solid T pen area lying down on days 1, 3, and 5