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Developing effective enrichments for group-housed sows

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The increasing trend towards group housing and new Code of Practice requirements for enrichment has generated a need for research into effective enrichments for sows. The University of Manitoba and Prairie Swine Centre have joined forces to study this question in their respective sow herds. The overall aim of these studies is to develop suitable enrichments for sows by identifying simple, safe and cost-effective enrichments that can be added to group sow housing systems, and form part of their routine husbandry practices.

Aggression, fear and stress in a social environment are difficult to eliminate because hierarchies will always be established. Sows in groups exhibit some of these negative behaviours, especially vulva-biting, stereotypies, as well as overt aggression, which can increase the chance of abortions. These behaviours can potentially lead to economic losses as animals that are injured, fearful or stressed may have lower than average conception rates and production.

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Multiple studies in growing pigs have shown that providing an enriched environment can reduce fear, stress, aggression and boredom in the group environment. They can also cause an increase in positive behaviours such as exploration and play. However, there is very little research on the use of enrichment objects in group gestation systems. The most effective type of enrichment, and what influence it can have on group behaviour and overall welfare has not been reported.

In this study we provided four different enrichment treatments to sows in group housing. Each enrichment object had properties known to be attractive to pigs. Our objective was to compare the time spent interacting with different enrich-

ments, and the daily activity patterns of sows to identify the most effective enrichment for sows. The effects of social status on sow behaviour and stress physiology was also studied.

Enrichment use and Behavioural observations

Two parallel studies have been completed at the Prairie Swine Center (PSC) and the University of Manitoba. We provided four treatments which consisted of: 1) constant provision of wood on chains (Constant), 2) rotation of three objects (rope, straw, wood on chain: Rotate), 3) rotation of three objects with an associative stimulus (bell or whistle: Stimulus), and 4) con-

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trol (no objects: Control). All enrichments were located in the middle of the pen to allow greater access, and were suspended to keep them clean and in place. Cameras were mounted over the pens and time-lapse photos were taken on different days to determine enrichment use, activities and postures of sows.

Direct observation of sows was carried out during the initial provision of the enrichments in the Rotate and Stimulus treatments. This was to determine if sows' reactions to enrichment can be increased by pairing it with an 'associative stimulus'. Six focal sows (three dominant and three subordinate) were selected at the beginning of each trial using a feed competition test. Sows were then studied to see if dominant and subordinate animals exhibit different levels of enrichment use, or interact with enrichment at different times in the day. Saliva samples were collected at the beginning and end of gestation to determine the stress levels in sows. Stereotypic behaviours and levels of injury due to aggression were also recorded.

Habituation is a major challenge when developing effective enrichment, as most animals tend to lose interest in objects over time. In an attempt to reduce habituation and sustain the interest of the sows, enrichment materials were switched three times per week in both the Rotate and Stimulus treatments.

Initial results

Data analysis from the study is ongoing, but initial observations at PSC show that, regardless of the treatment provided,



on average 15 per cent of sows were out of their free-access stalls and present in the loafing area of the pen throughout the day. More sows spent their time contacting and near the enrichment when the materials were rotated (Rotation and Stimulus treatments) than when the constant enrichment was used (percentage of sows within 1 m; Constant: 0.65 per cent; Rotate: 4.23 per cent; Stimulus: 2.61 per cent). The enrichment treatments had no effect on sow postures: overall, sows spent 78 per cent of their time lying, 20 per cent standing and two per cent sitting throughout the day.

In the Rotation and Stimulus treatments, straw (300 grams/sow) was placed on an area of solid floor on days three and 10. Observations of Rotation sows on day 10 showed that 24 per cent of sows were present in the enrichment area when straw was provided, compared to 12 per cent when no enrichment was provided (Control).

The presence of the enrichment objects in the pen resulted in sows spending time exploring the objects – this was observed particularly in the mornings after feeding. Our initial results

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show no significant differences in time spent exploring the different enrichments, however, the lowest level of interaction was observed in the Constant treatment. This is likely the result of habituation, as sows lost interest more quickly when the same object was left in the pen continuously.

Conclusion and implications

These initial results suggest that provision of enrichment to group-housed sows can help increase the use of pen space, and that rotating enrichments can increase sows' interactions with the enrichment. The straw enrichment produced the greatest response resulting in the largest number of sows interacting with the enrichment. This is likely because sows can ingest the straw making it very attractive as an enrichment, and additionally, it was spread over the floor, creating a larger surface area for simultaneous interaction by multiple sows. Further analysis is needed to compare the results at PSC and the University of Manitoba, and to examine the effects of sows' social status on their enrichment use, stress, aggression and stereotypies. These results, along with the additional studies described below, will form the basis for recommendations to producers on suitable enrichments for sows.

Plans for Future Research

Previous studies have indicated that young animals are highly motivated to explore object enrichments, whereas older

animals generally prefer enrichments that can be consumed. Because sows are feed restricted, they are more motivated to interact with feed-based enrichments, such as straw, beet pulp, corn husks or other high fibre materials. The problem with providing these materials has been how to present them conveniently, at a low cost, and without causing problems to liquid manure systems. Future studies at PSC will compare the effects of object versus fibre enrichment, and the number of enrichments provided per pen on sows' use of enrichments.

Sows will be given either pelletized straw or wood enrichments. Pelletized straw is produced using a steam-heating process which produces a clean, uniform material that is easy to handle as well as being more digestible. Fibre will be provided using a feed dispenser that sows must actively root, turning a rotor to dispense feed onto the floor. By comparing fibre and object enrichments we can quantify the benefits to sows and costs of each treatment, giving producers valuable information when considering effective enrichment materials for sows.

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