

A comparison of sow and piglet behaviour and productivity in the UMB farrowing pen compared to conventional farrowing crates

Progress Report

Introduction

In recent years there has been a growing interest in the standard of farrowing accommodation for commercial sows in Australia and in many countries around the world. Conventional farrowing crates are used extensively in the pork industry due to the general belief that piglet mortality and morbidity due to accidental crushing by the sow is reduced (Weary *et al.* 1996). However, restraining the sow in a farrowing crate for the duration of farrowing and lactation can have significant welfare implications for the behavioural, physiological and social needs of the sow. In the wild, sows are very active in the days preceding parturition and will travel up to 6.5 km in order to find a suitable nesting site (Wischnier *et al.* 2009). Conventional farrowing crates allow only very limited movement for the sow, and in combination with the lack of nesting materials, the sow is restricted in her ability to perform natural behaviours, which is a significant welfare concern (RSPCA Australia 2009). Despite this, producers ultimately require a farrowing system that encourages optimal productivity, such as large litter sizes and greatest piglet survival, as the number of piglets weaned will predominantly determine profitability. Weber *et al.* (2007) surveyed Swiss pig farms and reported that piglet mortality did not differ between farms using crated and penned farrowing systems, suggesting that restrictive conditions imposed on sows around parturition may be unnecessary and that an “improved” housing system involving less restraint may be feasible for commercial use.

The farrowing environment has been shown to have an impact on sow and piglet performance during lactation, such as sows’ feed intake and piglet growth (Cronin & Smith 1991; Cronin *et al.* 2000; Farmer *et al.* 2006; Sulabo *et al.* 2010). Farrowing pens that offer more space and nesting material have been studied in comparison to conventional farrowing crates (e.g. restricted space and no bedding) and have demonstrated several benefits to sow welfare and behaviour, such as reduced stress, increased feed and water intake and improved maternal behaviour (Cronin *et al.* 1991; Lawrence *et al.* 1994; Farmer *et al.* 2006; Wischnier *et al.* 2009). In turn, these improvements can potentially increase piglet weight gain, reduce piglet mortality and therefore maximize production (Sulabo *et al.* 2010).

Damm *et al.* (2005) investigated the lying down and rolling behaviours that sows tend to perform in loose housing systems. Both forms of sow movement are major risk factors for piglet mortality due to crushing. Damm *et al.* (2005) identify a need for supportive structures in pens to encourage a more controlled lying down movement, which could prevent piglets being crushed. Further research is required to address this issue in farrowing pen design, so that piglet mortality can be reduced without the need to restrain the sow. If piglet mortality can be decreased in farrowing pens, they have the potential to become increasingly widespread in commercial piggeries.

The aim of this project is to compare the effects of two farrowing systems, the prototype UMB farrowing pen and the standard farrowing crate, on sow behaviour and productivity and piglet

suckling behaviour, survival and growth to weaning. The UMB farrowing pen is a Norwegian prototype pen design, and it consists of a nesting area and an activity area. The UMB pen provides the sow with a considerable amount of space and nesting material, and also comprises several design features aimed at promoting piglet survival. One feature in particular was the inward sloping panels around the perimeter of the pen to assist the sow when lying down and changing positions, and also provides a safety zone for piglets. The project focuses on studying sow feeding behaviour and consumption, piglet suckling behaviour and weight gain, and piglet survival, in the two farrowing environments.

Producers ultimately work to optimize livestock productivity and subsequently maximize profitability. Therefore, the pens need to be economically viable in order to be considered for widespread use in commercial piggeries. This research project aims to assess sow and piglet productivity, in terms of sow feed intake and piglet growth and survival, to determine if the farrowing environment has an effect on performance.

Current progress and outcomes of the project

| Measure | Progress | Outcome |
|---|----------|--|
| Sow feed intake <ul style="list-style-type: none"> Consumption (kg/day) from Day 7 to 21 of lactation Average duration spent at feeder (weekly 24hr video observation) | Complete | <ul style="list-style-type: none"> No significant difference in feed consumption (kg/day) between treatments Sows in UMB pens fed a greater number of times on Day 7 Sows in crates spent a longer duration at feeder on Day 21 |
| Piglet suckling <ul style="list-style-type: none"> Day 7, 14, 21: 24 hour video observation | Complete | <ul style="list-style-type: none"> No difference in total number of suckling bouts on Day 7 or 14, however piglets in crates suckling a greater number of times on Day 21 |
| Piglet bodyweight <ul style="list-style-type: none"> Day 1, 7, 14, 21, weaning litter weights | Complete | <ul style="list-style-type: none"> Piglets in crates had a higher daily weight gain than piglets in UMB pens |
| Piglet Mortality <ul style="list-style-type: none"> Live-born piglet deaths from birth to weaning | Complete | <ul style="list-style-type: none"> No significant difference between UMB pens and crates |

Discussion

Several studies have reported the farrowing environment to have an effect on sow feed intake (Farmer *et al.* 2006; Sulabo *et al.* 2010). Farmer *et al.* (2006) demonstrated that sows housed in farrowing pens consumed a greater amount of feed than sows in crates. In the present experiment, although the sows in UMB pens consumed ten percent more feed between Day 7 and 21 of lactation, the difference was not significant compared to the sows in the farrowing crates. This could possibly be attributed to the small sample size in the experiment.

Piglets in the farrowing crates achieved a greater daily weight gain than piglets in the UMB pens. The most likely reason for this outcome is due to the effect of ambient temperature on piglet growth. Although the two treatments were under the same shed roof, the room with the UMB pens was larger, less well insulated and exposed to a greater amount of natural ventilation. Consequently, for the duration of the experiment, the ambient temperature in the room with the UMB pens was lower than the room with the farrowing crates. In addition to this, although the UMB pens had heated panels under the rubber floor, they did not have overhead piglet heaters, as in the farrowing crates. Thermoregulation in piglets is critical, and it is likely that in this study the piglets in the UMB pens had to utilize more energy for heat production than growth, possibly explaining the lower daily weight gain.

The number of piglet deaths to weaning (live-born piglets) did not differ significantly between treatments. Weber (1997) and Weber *et al.* (2007) reported similar results in their Swiss trials, in that they found no difference in piglet mortality between farrowing pens and farrowing crates. Cronin *et al.* (2000) compared sow and litter performance in the 'Werribee Farrowing Pen' and in farrowing crates and also found no difference in piglet mortality between the two treatments. These findings suggest that the need to restrain the sow in order to reduce piglet mortality may be unnecessary. However, a greater proportion of piglet deaths occur due to crushing in pens than crates, but fewer deaths in pens as the result of other causes (Cronin *et al.* 2000; Weber *et al.* 2007). In the present trial, 70% of pre-weaning piglet deaths in the UMB pens was the result of crushing, compared to 17.9% in the crates. However, there was a lower proportion of pre-weaning piglet deaths due to other causes (chilling, illness, splayed legs) in the UMB pens compared to the crates.

Conclusions and Future Recommendations

The UMB farrowing pens offer a potential alternative to the conventional farrowing crates to improve sow and piglet welfare. However, research needs to continue to improve sow and piglet productivity in this new prototype farrowing pen system. Further research is required to improve pen design so that piglet mortality due to crushing can be reduced without the need to restrain the sow. Studies should focus on maintaining a stable ambient temperature so that piglet growth can be more accurately compared between pen and crate treatments. The installation of overhead piglet heaters and a piglet creep area in the UMB pen could potentially increase piglet growth and maximize piglet survival.

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