# The effects of housing on sow and piglet welfare

*Discusses ways of improving the welfare of farrowing sows and their litters.*

**By Sarah Vanessa Mo**

Word count: 1000

## Introduction

The construction of a suitable farrowing environment has always been a challenge for welfare scientists. The system has to satisfy the "triangle of needs" among sow, piglets and farmers (Baxter *et al*., 2011). In this essay, we will discuss existing approaches in maximising sow and piglet welfare that are practical for commercial farms.

## Discussion

Hales *et al.* (2014) compared preweaning mortality in farrowing crates (FC) and free farrowing pens (FFP) in three commercial production herds with 400, 580 and 640 sows respectively. One week before parturition, sows were moved to the farrowing unit. They were randomly allocated to two treatments: FC or FFP. The design of FFP was similar in all three herds with >5$m^2$ space, sloping wall, farrowing rails and creep area for protection. Piglet mortality was analysed before and after litter equalisation. The effect of housing, herd, parity and total number of piglets born and equalised litter size was analysed using linear models (Hales *et al*., 2014). The study found that mortality of piglets before and after equalisation in FFP was greater than in FC for all 3 herds. Piglet mortality increased with parity of sows and litter size after equalisation (Hales *et al*., 2014). No significant connections were detected between housing and parity or housing and litter size, and Hales *et al.* (2014) concluded that FFP was not yet a well-developed system for farrowing sows.

However, a proportion of sows in FFP had results similar to sows in FC (Hales *et al*., 2014). This indicates that FFP are applicable if sows could be selected specifically for temperament and behaviour (Hales *et al*., 2014). Further studies should be done on the temperament and behaviour of sows that performed well in FFP. In herd B and C for this study sows were held in individual stalls during gestation. This might affect sows' behaviour and thus the experimental outcome as previous housing experiences can affect a sow's behaviour during early pregnancy (Weng *et al*., 2009). Hales *et al.* (2014) suggested that confining sows for a few days after farrowing would render the levels of mortality in FFP similar to those obtained in FC, since the difference in mortality rates between the two systems is greatest in the first week after farrowing.

Moustsen *et al*. (2013) investigated whether confinement of sows for a limited number of days after farrowing is a factor affecting piglet mortality. A total of 220 sows were randomly allocated to 4 treatments: (A) loose during the entire experiment, (B) crated day 0-4 postpartum, (C) crated day 0-7 postpartum, (D) crated from introduction to farrowing pen to day 7. Limited nest-building material was provided and the litter was equalised 24 hours after birth. The dates and causes of piglet deaths were recorded. In (A) sows had the highest mortality in the first 3 days and most piglets died because of crushing (Moustsen *et al*., 2013). However, piglet mortality from day 3-10 was not significantly different from other groups (Moustsen *et al*., 2013). No differences in nest-building behaviours were observed (Moustsen *et al*., 2013).

Moustsen *et al*. (2013) concluded that, since most piglets died early postpartum, confining the sow for 4 days postpartum reduces suckling piglet mortality. This allows more freedom for sows to move as they do not have to be restrained during the entire lactation period. However, Baxter *et al.* (2011) argued that both physical and behavioural needs, such as nest-building, should be taken into account for pig welfare.

Nest-building is an innate behaviour unaltered by domestication. This suggests that it still has some biological significance to the animal (Baxter *et al*., 2011). Yun *et al*. (2013) investigated whether nest-building materials and farrowing housing contribute to a change in circulating oxytocin concentration (OC) and maternal characteristics in sows. A total of 33 sows were assigned to 3 treatments: CRATE, farrowing crate; PEN, a pen with farrowing crate opened; and NEST, a pen with farrowing crate opened. Treatment CRATE and PEN were given limited amounts of substrate while NEST were provided with plentiful substrate for nest-building. All sows were confined in the farrowing crate postpartum for 7 days. Blood

samples were collected for hormonal assays and pigs were video-recorded to monitor maternal behaviours.

Yun *et al*. (2013) showed that an abundance of nesting materials leads to an increase in sow plasma OC from 3 days before farrowing to 7 days postpartum. Increased farrowing space alone did not contribute to increased OC levels (Yun *et al.*, 2013). Moreover, NEST sows showed a higher degree of behavioural carefulness toward offspring than the sows in other treatments and were correlated with OC during day 7 postpartum (Yun *et al*., 2013). Furthermore, sows in CRATE needed extra udder stimulation for piglets to obtain milk in the early lactation period due to lower OC levels (Yun *et al*., 2013).

Oxytocin modulates maternal behaviour and stimulates milk production by encouraging sows to nurse their piglets (Yun *et al*., 2013). The current study suggested a possible association between nesting behaviours and increased OC (Yun *et al*., 2013). However, since the sows were crated postpartum for 7 days, the effect of increased maternal behaviours could not be quantified by analysing piglet mortality. It would be of scientific interest and practical importance if nesting behaviours correlated with reduced crushing of piglets due to increased carefulness.

## Conclusions

The above three studies showed that improving farrowing pen design alone was not sufficient to improve both sow and litter welfare. Confining sows 4 days postpartum reduced piglet mortality while sows do not have to be crated for the whole lactating period to yield similar production efficiency. Needs other than physical and behavioural, such as nesting-behaviours, should be considered. Providing suitable space and nesting materials before parturition improved welfare by allowing sows to express their normal behaviours. Further studies should investigate the possible relationships between nesting and maternal behaviours. Enhanced maternal behaviours could directly improve piglet survival and thus production efficiency. Allowing nesting behaviour in farrowing sows might be a solution that satisfies the “triangle of needs”, thus improving welfare.

## References

Baxter, E.M., Lawrence, A.B., Edwards, S.A. 2011 Alternative farrowing systems: design criteria for farrowing systems based on the biological needs of sows and piglets. Animal. 2011 Feb;5(4):580-600. doi: 10.1017/S1751731110002272.

Hales, J., Moustsen, V.A., Nielsen, M.B.F., Hansen, C.F. 2014 Higher preweaning mortality in free farrowing pens compared with farrowing crates in three commercial pig farms. *Animal*, 8, 1, 113-120.

Moustsen, V.A., Hales, J., Lahrmann, H.P., Weber, P.M., Hansen, C.F. 2013 Confinement of lactating sows in crates for 4 days after farrowing reduces piglet mortality. *Animal*, 7, 4, 648-654.

Weng, R.C., Edwards, S.A., Hsia, L.C. 2009 Effect of individual, group or ESF housing in pregnancy and individual or group housing in lactation on sow behavior. *Asian-Australasian Journal of Animal Sciences*, 22, 1574-1580.

Yun, J., Swana, K.M., Vienolab, K., Farmerc, C., Olivierod, C., Peltoniemid, O., Valrosa, A. 2013 Nest-building in sows: Effects of farrowing housing on hormonal modulation of maternal characteristics. *Applied Animal Behavior Science*, 148, 77-84.