

Peripartal behaviour and teat lesions of sows in farrowing crates and in a loose-housing system

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Abstract

Housing of farrowing and lactating sows in farrowing crates can cause a number of welfare problems. Recently, alternative farrowing pens have been developed which allow the sow to turn around and move freely. In this experiment a conventional farrowing crate (C; 5.0 m²; the sow is crated permanently), the Trapez pen (T; 6.7 m²; with a crate opened two days after farrowing) and a modified FAT2 pen (F; 6.7 m²; loose-housing system with nest and dunging area), were compared. The behaviour of sows was recorded from 6 hours ante partum to 24 hours post partum and analysed for duration of birth, number of posture changes, activities indicating nest building and piglet crushing. Sows were inspected for skin lesions at days 5 and 23, post farrowing. There was a tendency for longer birth duration and restlessness during farrowing when sows were crated. Sows in F and T crushed more piglets than sows in C but only few sows were concerned. In C more sows had severe injuries on the udder and on the limbs than in F and T. It can be concluded that the health and behaviour of farrowing and lactating sows are negatively affected when being housed in conventional pens with crates and slatted flooring. Further development is required to minimise piglet crushing in loose-housing systems.

Keywords: animal welfare, behaviour, farrowing pen, pig, piglet crushing, skin lesions

Introduction

In order to prevent piglet crushing and to save costs, farrowing and lactating sows are usually kept in pens with a farrowing crate and slatted flooring. The restriction of the sows' movements causes a number of welfare problems for the sow: ie being deprived of the opportunity to demarcate separate lying and defaecation areas, no possibility for nest building (Arey *et al* 1991) and a high prevalence of skin lesions (Putz 2002). Recently, alternative farrowing pens have been developed which allow the sow to move around. However, farmers are concerned about high costs and increased piglet crushing. The Council of the European Union instructed the Commission to submit a report not later than the 1st of January 2008 regarding further developments of loose-housing systems for sows, which meet the needs of the sow without compromising piglet survival (EU 2001). In this study a conventional farrowing crate, a pen where sows are crated around farrowing and a loose housing system were compared, as a pilot study.

Materials and methods

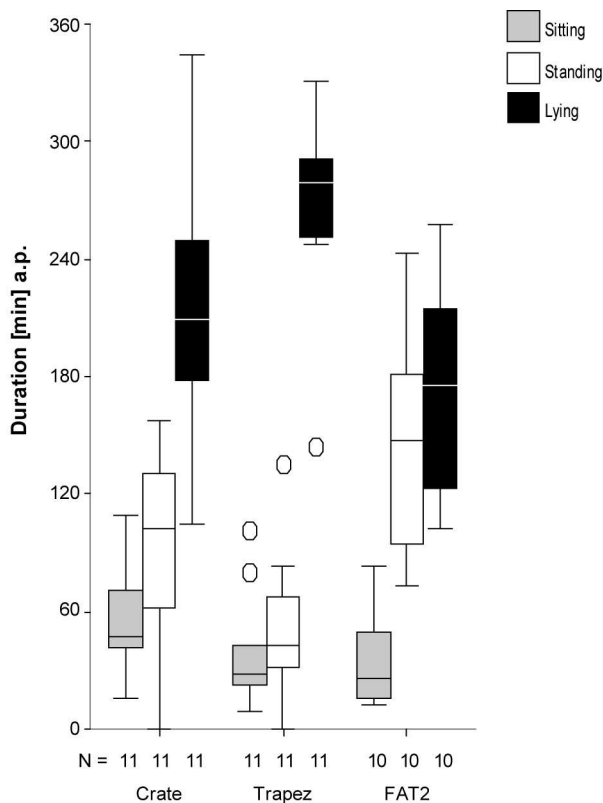
Data were collected between January 2003 and October 2004. The sow herd (Large White) was managed in a three-week cycle and an all-in-all-out system. Piglets were weaned at four weeks of age. Three types of farrowing pens were investigated:

1) A Conventional Pen (C) of 5.0 m² with a farrowing crate, slatted flooring and a heated creep area; sows were crated permanently and no straw was provided. 2) A Trapez Pen (T) of 6.7 m² with a farrowing crate and partially slatted flooring. The sows were crated from one day prior to farrowing to two days post farrowing; before and after this period sows could move around and straw was provided in the non-perforated lying area. 3) A modified FAT2-Pen (Weber & Schick 1996) with loose-housing of sows (F). The pen (6.7 m²) was divided into a lying area with concrete flooring and straw, a defaecating area with slatted flooring and a heated creep area.

Behaviour of sows, C (12), T (11) and F (10) was video recorded from six hours ante partum (a.p.) to 24 hours post partum (p.p.). Frequencies and durations of postures (lying on sternum, on side/sternum or on side, sitting, standing including walking), pawing, head activities (active on floor, active upraised, above trough, inactive) and birth duration were collected by the programme Observer® 4.0 (Noldus Information Technology). Data were analysed with Kruskal-Wallis and Mann-Whitney *U* tests using SPSS 11.5.

The integument of the sows, C (59), T (25) and F (39) was inspected for skin lesions and cleanliness at days five and 23 post farrowing. Attention was paid mainly to injuries on teats, joints and claws.

Figure 1



Duration of sitting, standing and lying of sows in the Crate, Trapez and FAT2 pens from six hours prior to farrowing (a.p.) in minutes. The data are presented as a box plot: the box contains the middle 50% of the data, the line within the box indicating the median. The top and the bottom of each box represent the 75th and 25th percentile, respectively. The ends of the vertical lines represent the minimum and maximum data, the open circles represent outliers.

Productivity data of the sows, C (10), T (47) and F (53) were recorded and analysed using the programme KW-Sauenplaner®.

Results

Behaviour

Ante partum sows in F performed standing longer (Mann-Whitney *U* test, $P < 0.05$) than in C and T, where sows had been crated (Figure 1). In contrast, sows in T showed an increased duration of lying, mostly in a side position, and also a higher frequency of lying in a side/sternum position before farrowing.

Sows showed a high individual variability in the number of posture changes prior to farrowing (58 to 125). There was a tendency ($P < 0.1$) for sows in C and T to change posture more frequently than in F (Figure 2; left). Prior to farrowing sows in F performed 'head active on floor' longer than sows in T ($P = 0.001$) and C ($P = 0.072$). Sows in T showed 'head inactive' longest ($P < 0.01$). No difference in frequency of certain head activities and in pawing could be found.

Duration of farrowing was between 1 hr 20 min 9 sec and 6 hr 14 min 35 sec and showed a high individual variability (Table 1). Piglet-to-piglet interval of crated sows (C and T) was longer than that of loose-housed sows of F (Table 1).

During farrowing, sows changed posture between five and 128 times. Comparison of the sows from different farrowing systems showed no significant difference. In the post partum period sows in F changed posture more frequently ($P < 0.1$) than in C and T (Figure 2; right).

Skin lesions

At day 23 post farrowing 40% of the sows in C had at least one severe teat lesion and 20% had two or more lesions on the udder. In F and T 20% showed one teat lesion. Teat lesions were cumulated on the fourth to seventh pair of teats. The prevalence of injuries on claws and joints in C was 40% (F and T: 16%) and lesions were found mostly at the lateral accessory digit of the hind limb. Compared to F and T, sows in C had a significantly higher prevalence of skin lesions on the udder and on the limbs (Mann-Whitney *U* test, $P < 0.05$). Sows in C had a cleaner udder at day five than sows in F and T. In contrast the vulva of crated sow was more dirty than those of the sows in F.

Productivity data

In C significantly more ($P < 0.01$) piglets per litter have been weaned than in T and F (10.08 ± 2.06) as opposed to 9.06 ± 2.28 and 9.11 ± 2.33 , respectively. Loss of piglets caused by piglet crushing was higher ($P < 0.01$) in T and F ie C (0.45 ± 0.74), T (0.82 ± 1.70) and F (1.83 ± 2.57). In F only 11% of the sows were responsible for 48% of the piglets crushed. Loss caused by starvation of piglets was lowest in F ($P < 0.1$).

Discussion

A higher frequency of posture changes in combination with a higher duration of lying inactive and a lower duration of activities with head on the floor prior to farrowing indicate restlessness and enforced inactivity of crated sows compared to the loose-housed sows in the FAT2 pen. The attempts of crated sows to nest build seems to be interrupted due to immobility and the lack of nest building material. Nest building behaviour is initiated endogenously and is performed even in the absence of nest building materials and when a preformed nest is provided (ie Arey *et al* 1991; Jensen 1993; Cronin *et al* 1996). Restrictions in nest building behaviour result in restlessness, frequent posture changes, stereotypies, increased stress and prolonged duration of farrowing (see Thodberg *et al* 2002).

High piglet-to-piglet interval of crated sows can be interpreted as a reaction to the restricted conditions (Weber & Troxler 1988). On the other hand there was no increased restlessness during farrowing. Due to the high individual variability of behaviour during birth further investigations are necessary.

The high prevalence of skin lesions in crated sows indicates the inability of sows to adapt to the housing conditions. The high number of teats with severe lesions in the caudal part

Figure 2

Number of posture changes from six hours prior to farrowing (a.p. left) and during the 24 hours post farrowing (p.p. right) in the Crate, Trapez and FAT2 pens. The data are presented as a box plot: the box contains the middle 50% of the data, the line within the box indicating the median. The top and the bottom of each box represent the 75th and 25th percentile, respectively. The ends of the vertical lines represent the minimum and maximum data.

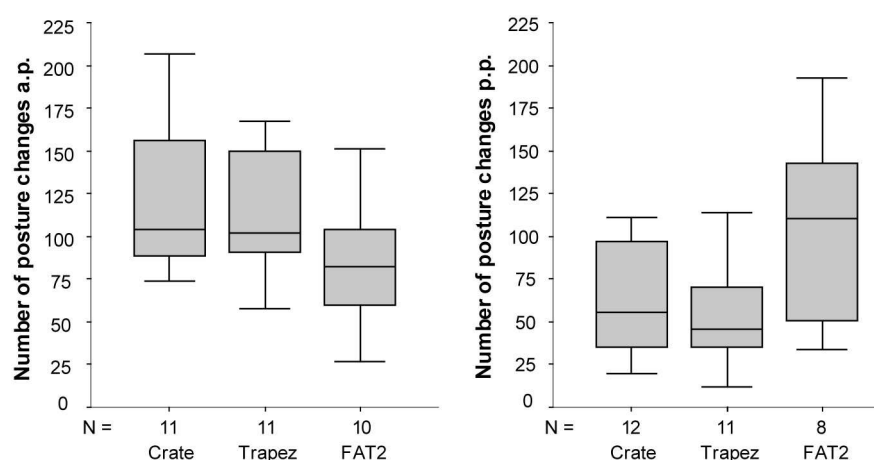


Table 1 Birth duration per piglet (min) in Crate, Trapez and FAT2 pens.

	Duration of farrowing		
	Mean (\pm SD)	Maximum	Differences between systems
Crate	21: 37 (\pm 35: 09)	min 04: 48: 36 h	a: $P = 0.068$
Trapez	17: 40 (\pm 22: 56)	min 02: 11: 14 h	b: $P = 0.03$
FAT2	15: 22 (\pm 21: 28)	min 02: 01: 30 h	ab

of the udder is caused by abrasions from the sows' hind limbs as a result of restriction when getting up and lying down, in combination with slatted flooring. Putz (2002) observed teat lesions of sows with an prevalence of 45.5 to 100% dependent on the type of flooring.

Sows in the modified FAT2 and Trapez pen had higher piglet losses during the lactation period compared to permanently crated sows. This result is not in accordance with studies from Schmid (1992), Drossart van Dusseldorp (1997) and Weber *et al* (2005) which all found no differences in piglet losses between loose-housed and crated sows. The high level of piglet losses in the modified FAT2 pen is a consequence of excessive piglet crushing. We assume that in loose-housing systems particularly fat sows react with reduced care when lying down during and after birth if space allowance is restricted and air temperature is high.

Conclusions

We conclude that the welfare of sows is negatively affected when housed in farrowing crates. In order to prevent excessive piglet crushing, loose-housing systems for farrowing and lactating sows must have a lying area where the sow can turn around and lie down without obstruction. Sows must be selected and fed so that they are capable of farrowing in loose housing systems.

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