

ALTERNATIVE FARROWING SYSTEMS

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ABSTRACT

Loose housing for gestating sows is an established European housing system. Furthermore, in some countries like Sweden, Norway and Switzerland crates are not allowed in the farrowing units. Statistical results of the transition period from Switzerland show that there are no overall differences in piglet losses between farms with or without crates. But you cannot pass Swiss parameters in pig production to other countries. EU-barometers show that an overwhelming majority of consumers do not agree with crates. It is a question of how long we can exist in the market against the interests of consumers. Management of alternative farrowing systems is one of the biggest challenges for pig producers. We need different housing conditions, new breeding objectives, adapted animals, mindful staff and a better understanding of sows. We are just at the beginning of a new era.

There is a broad spectrum of causes for piglet crushing and there are already a lot of management tools and equipment available to reduce crushing considerably. Single parameters are closely associated and it is very difficult to judge them separately. Piglet crushing is not only a question of configuration of the pen. Design and temperature of the nest box may help to reduce piglet crushing. Fundamentally, producers should place greater emphasis on selection of sows with respect to mothering properties. In addition to the housing conditions there is an influence on the behaviour of sows by the manner of sow-handling.

INTRODUCTION: LOOSE NURSING SOWS

Many breeders and scientists criticised the farrowing crate concept when it was first introduced. Their concern was the lack of attention to the welfare requirements of the sow. Nevertheless, different models have been developed and popularised around the world to such an extent that the farrowing crate has become a recognised, standard feature of the farrowing pen.

Sows may be housed in farrowing pens for about four weeks. It is an important period in the whole reproduction cycle. The pen first has to provide a calm and relaxing atmosphere during the last days of pregnancy. It should allow the possibility to perform behavioural activity connected with farrowing, for example, nest building. The facilities should be suitable for the farrowing act, including the ability for stock people to safely assist in piglet delivery. And finally, once sows are nursing their litters, consideration has to be paid to the micro-environment, protection and space for the growing piglets.

Loose housing for gestating sows is well established in Europe. But what happens when sows are allowed to move in the farrowing pen? Until now the argument has been that piglet losses are too high in free-range pens. But statistical investigations from Switzerland show there is no significant difference in the overall losses of piglets kept in pens with or without farrowing crates (Table 1). Crating of sows is supposed to avoid piglet crushing, but natural behaviour like nest building on the day of farrowing and during the birth cannot be carried out. Comfort behaviour (stretching, shaking, scratching and rubbing) takes only a little time during the course of the day. But it is generally regarded as being most important for an animal's welfare in respect of physiological and ethological aspects. Table 2 shows performance of the last business year in both Boxberg units. We have more weaned piglets in the units without crates but at the same time also 6% more piglets lost.

Table 1. Piglet losses on farms with or without crates in their farrowing units. (Weber, 2006, Switzerland)

Farm	With crates	Without crates
Number of farms	482	173
Number of litters	44.837	18.824
Piglets born alive/litter	11.0	11.0
Piglets born dead/litter	0.7	0.6
Piglets weaned/litter	9.6	9.6
Piglets lost overall, %	12.1	12.1
- Crushed, %	4.5	5.4
- Other reasons, %	7.6	6.7

Table 2. Comparison of performance with or without crates in the farrowing pen (conventional and alternative part of Boxberg/Germany).

Performance - July 2008 to June 2009	With crates	Without crates
Number of sows	178	65
Non-return-rate, %	15.4	6.5
Piglets at large/litter	12.44	13.1
Piglets born alive/litter	12.16	12.93
Piglets born dead/litter	0.38	0.17
Birth weight, kg	1.53	1.45
Piglets weaned/litter	9.57	9.76
Weaning weight/piglet, kg	7.54	8.2
Piglet losses, %	20.06	26.27
Piglets weaned/sow/year	19.21	22.56

SOME PROBLEMS WITH SOWS IN FARROWING CRATES

The transition to alternative farrowing systems is based on problems in farrowing units with crates. Some of them are listed below:

- Group housing for pregnant sows enforces natural behaviour like separation between the lying and dunging area. This exercised behaviour cannot be executed in the critical time during birth and suckling period leading to negative consequences, like constipation.
- Sows in crates cannot carry out effective nesting behaviour. Therefore, births last longer, there are more dead piglets, and more problems with MMA (mastitis, metritis andagalactia).
- Separated functional areas for lying, feeding and dunging with solid floors in the lying area make it possible to reduce the temperature in the farrowing house to about 50 to 59°F. Thus piglets stay more in their nest, sows eat more and give more milk.
- With low overall temperature you save money on heating energy and staff has better environmental conditions.
- In separated areas you can better adapt the floor to different demands. Thus sows suffer less from shoulder lesions, dewclaw, claw and leg injuries. Natural standing up and lying down behaviour reduces teat injuries and you can achieve more natural abrasion of claws.
- Loose nursing sows are much cleaner compared to sows in crates.
- Crates are not favoured by the majority of the European consumers and the EU intends to respect consumer demands.
- Furthermore the EU is aiming to be the leader in animal health and animal protection. In this manner, we think we can create more value for producers.

COMPARISON OF DIFFERENT EQUIPMENT IN FREE-RANGE PENS

To reduce piglet losses in an experiment at the Centre for Education and Knowledge Boxberg, Germany in one part of the alternative unit different equipment was installed. Primarily the farrowing pens have been subdivided in several areas to determine the location of crushing (Where?). Second, the sow behaviour leading to crushing was described (How?). Third, the point of time of the occurrence was noticed (When?). Fourth, behaviour of the piglets during the incidence of crushing (Why?). The study included behaviour of the sows during 24 hours before farrowing. There was video recording 24 hours before farrowing until 10 days following. Furthermore, an ethogram with relevant parameters of behaviour of the sows was established. To estimate the overall situation, the temperatures outside and in the sow lying area as well as in the nest box were recorded. Table 3 shows the overall performance without crush bars over four replicates.

Table 3. Performance without crush bars over four replicates.

	Born alive	Born dead	Crushed	Rest of dead piglets	Overall losses	Weaned
Sum	234	20	33	24	57	177
Absolute average/litter	12.3	1.05	1.74	1.26	3	9.32
Relative average/litter	--	--	14.10%	10.26%	24.36%	--

This study showed that most of the piglets (45%) are crushed in the middle of the pen. Piglet crushing was mainly caused by lying down of the sows (58%). Most of the piglets (78%) were

crushed within the first day after birth. Almost all crushing incidents (97%) took place in the first 3 days after farrowing. 45% of the crushing incidents occurred during active phases of the piglets in the lying area of their mother.

Iron Bar in Front of the Nest and a Sloped Board in the Experiment

Due to these results we installed 2 crush bars in the pen; One iron bar in front of the nest box and a sloped board along the long side of the pen to encourage the sows to lie down in this area. The results showed that there were not any piglets crushed in front of the nest box. It was not possible to reduce piglet crushing at the long side of the pen. We did find out through video analysis that piglets used the space under this board for sheltering. Thus the piglets could save themselves during the lying down procedure of their mother. On the other hand, the sloped boards were also an invitation for piglets to lie down with the rear part of their body under this board and it might be the case that they were crushed while sleeping. Therefore we recommend that producers should not use much straw in the pen during the first 3 days after farrowing but instead use saw dust or shavings.

The study of behaviour showed impressively how all sows used straw intensively for nest-building 12 hours ante partum. We noticed more crushed piglets in those litters with sows showing, during this period, an agitated and nervous behaviour with lots of changes in position. In the case of too low or too high temperature in the nest box, the piglets stayed closer to their mother, thereby increasing the risk for piglet crushing.

Altogether the losses caused by crushing were reduced in the experimental group when compared to the standard farrowing pen (Tables 4 and 5). But in the experimental group, there were 2.5 more piglets born alive. Furthermore one sow in this group crushed 7 piglets, two days after farrowing, in one night.

Table 4. Performance in the comparison group without any crush bar in replicates 5 and 6.

	Born alive	Born dead	Crushed	Rest of dead piglets	Overall losses	Weaned
Sum	106	8	9	8	17	89
Absolute average/litter	10.6	0.8	0.9	0.8	1.7	8.9
Relative average/litter	--	--	8.5%	7.54%	16.04%	--

Table 5. Performance in the group with crush bars (experimental group) in replicates 5 and 6.

	Born alive	Born dead	Crushed	Rest of dead piglets	Overall losses	Weaned
Sum	118	1	15	9	24	94
Absolute average/litter	13.11	0.11	1.66	1	2.66	10.44
Relative average/litter	--	--	12.71%	7.63%	20.34%	--

EXPERIENCES FROM COMMERCIAL FARMS WITHOUT CRATES

Organic farms are not allowed to use crates for their sows. In addition, some conventional farms with outdoor or indoor breeding have used free-range farrowing for many years. So there are many valuable experiences to lower the risk for piglet losses. Some of them are described below:

Positive Sow Parameters

- Stable human-animal relationship. It is worthwhile to worry about the gilts at a very early age.
- Calm sows - especially before birth - are mostly careful with their piglets. Therefore take the time to ensure a quiet atmosphere in the farrowing house. Furthermore the sows have to be housed in the farrowing room one week before farrowing.
- Enough milk production enables piglets to stay away from their mother for longer periods.

Negative Parameters in Respect to Temperatures

Optimal temperature in the lying area during farrowing time is about 68°F; after farrowing is about 50 to 59°F. Adapt the temperature to the lying behaviour of the piglets.

- Too high temperature in the nest disposes the piglets to lie partly or completely outside of the nest.
- Too low temperature in the nest is one of the reasons why piglets are looking for warmth by their mother.
- Too high temperature during hot weather in the sow lying area disposes the piglets to stay outside their nest.

Reasons for Breeding and Selecting

- Gilts have to be housed in small groups. So they have many possibilities to find a wall for lying down and to get accustomed to this behaviour.
- Most of the litters of gilts have no or only one crushed piglet. So, if one gilt crushes more than two piglets you should not serve her again.

- In closed herds with their own gilt production you should select for a certain amount of maternal instinct in your multiplication sows.

Structural Aspects: Optimization of the Nest

- Larger litters need larger nest sizes. At least 1 m² (11 ft²).
- The entrance to the nest must be very broad so piglets have got a bigger chance to find their way into the nest.
- People should not use curtains in front of the nest to save energy. Curtains are big obstacles for little piglets.
- Sows are allowed to put their head into the nest. The iron rail in front of the nest has a height of 30 to 35 cm (1 ft) to avoid jamming.
- With about 10 cm (0.3 ft) deep nest floor you can increase the attractiveness of the nest dramatically. This way most of the straw in the nest remains there. Piglets recognize very well the difference between the sow lying area with only sawdust and the plentiful straw in their nest. With deepened nests and straw you can put your in-floor water heating on at a high temperature (104°F).
- With a single leaf damper, piglets can be separated easily from the service alley for different management actions.

Structural Aspects: Optimization Farrowing Rails

- You need straight or curved iron rails to avoid a dead zone in the pen for piglets. Newborn piglets must not be able to get trapped in a dead zone and be able to circulate with their mother at any time.
- Boards on the walls of the pen stimulate adapted sows to lie down against them.
- Researchers notice most of the piglets are crushed in the middle of the pen. This is because this area is the largest one and frequented most often. A lot of crushing is due to changing of position by the sows. Thus more piglets are crushed during position changes than compared to lying down behaviour. A number of farms have had positive experiences with a steering stick in the middle of the pen (Figure 1).

Figure 1. Many farms wean about one more piglet/sow/year by the steering stick.



Structural Aspects: Optimization Feeding

- Feeding should not be in the lying area but outside in a second area of the pen or outside of the farrowing house. Thereby piglet injuries through restlessness during feeding time are much lower and the tidiness in the pen is much better (Table 6).
- Some people feed nursing sows only with dry concentrate in the pen to check more easily how much feed sows accept.

Table 6. Advantages and disadvantages of different trough positions.

Trough position	Inside near survey alley	Inside near exit to yard	Outside in the yard
Overview	+	+	-
Tidiness	--	-	++
Safety for piglets	--	-	+

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