

Oral presentation

Open Access

Loose housing of sows – current systems

Niels-Peder Nielsen

Address: Dept. of Housing and Production Systems, Danish Pig Production, Axeltorv 3, DK-1609 Copenhagen, Denmark

Email: Niels-Peder Nielsen - NPN@danishmeat.dk

from The role of the veterinarian in animal welfare. Animal welfare: too much or too little? The 21st Symposium of the Nordic Committee for Veterinary Scientific Cooperation (NKVet) Værløse, Denmark. 24–25 September 2007

Published: 19 August 2008

Acta Veterinaria Scandinavica 2008, 50(Suppl 1):S8 doi:10.1186/1751-0147-50-S1-S8

This abstract is available from: <http://www.actavetscand.com/content/50/S1/S8>

© 2008 Nielsen; licensee BioMed Central Ltd.

Introduction

The pig producer is faced with many challenges when establishing new pig facilities today. Besides existing legislation, he must often take into consideration market requirements concerning contract production, neighbours and others and try to minimise the nuisances related to odour and transport of animals, etc. At the same time, the design of the housing facilities must be aimed at high health and productivity without compromising animal welfare and working environment.

Legislation

A revision of several EC directives resulted in Danish legislation that commenced May 15, 2003. Furthermore, Danish legislation concerning hospital pens commenced January 1, 2005.

- Act concerning changing act on indoor housing of gestating sows and gilts, and act on indoor housing of weaners, breeding stock and finishers (Act no. 295)
- Ministerial order on protection of pigs (BEK no. 323)
- Ministerial order on tail docking and castration of animals (BEK no. 324)
- Ministerial order concerning changing ministerial order on protection of pigs (BEK no. 1120)

Housing facilities for sows

Gestating sows must be housed in group-housing systems from four weeks after service. There is no legislative requirement for group-housing in the service section, but pigs produced for the UK market must be loose housed in the service section. There is still a need for further development of service and gestation sections to ensure a high efficiency and rational work procedures. There is an increasing interest in loose housing of lactating sows, and it is expected that the development within this area will also, to a certain degree, improve the potential of traditional farrowing pens.

When establishing loose housing, it is essential to be aware that, compared with traditional systems, this type of production largely takes place on the animals' terms. (Report 593 and 602)

The sows' dimensions have changed over time, which has been confirmed by measurements of Danish crossbreds. This has resulted in new recommendations to crate and pen dimensions for lactating sows in traditional farrowing pens. A study is evaluating the production level and hygiene in farrowing crates and farrowing pens where the dimensions comply with the new recommendations. (Act. no. 649 and Report no 432 and 414)

Based on the measurements of Danish crossbred sows, new recommendations have been published for dimensions of crates for non-lactating sows (Table 1). The recommendations include crates in service/control sections,

Table 1: New guiding recommendations

Housing section	Type of crate	Width (cm)	Length (cm)
Service/control section with housing in crates	Standard	60	210
	Large	70	210
Service/control section with group-housing	Feeding and insemination crate	65	210
Gestation unit with group-housing	Feeding and resting crate	60	210
	Feeding crate (cafeteria)	50	190

feeding and resting crates, feeding and insemination crates, and feeding crates.

All measurements are inside measurements. The length is stated from the back of the trough, i.e. the edge of the trough nearest to the sow.

The new recommendations are based on a study of Danish crossbred sows, which revealed that the majority of the young sows that had weaned one or two litters were shorter than 190 cm and slimmer than 60 cm, while more than half of the older sows were bigger.

Enrichment and rooting material

Gilts and boars in all housing facilities (existing and new) must have permanent access to straw or other rooting material.

In existing facilities for gilts and sows taken into use before May 15, 2003, the requirement for straw or other rooting material must be met by January 1, 2013. In new housing facilities for gilts and sows (including service sections, gestation sections and farrowing sections), straw or other rooting material must be available.

Service section

Over the past years, the Danish Applied Pig Research Scheme has conducted several trials concerning group-housing in the service section. The development today is focused on pens for groups where the sows have free access to feeding and insemination crates.

Group-housing with access to feeding and insemination crates

There is no competition during feeding in service sections where the sows are housed in groups with permanent access to feeding and insemination crates. The sows can go into the crates in connection with the establishment of hierarchy or when they "mount" each other. Trial results show that young sows have a larger litter size if they are housed individually in service sections with loose housing. (Report no 698) It is recommended to establish the service section in a separate building. The pens must be spacious to allow hierarchy to be formed within the first few days after penning. The floor must consist of drained

deep litter to prevent the sows from skidding. (Report no 559)

Gestation sections – group-housed gestating sows

Electronic sow feeding and systems with one feeding and resting crate per sow are the most widespread feeding principles for group-housed gestating sows, as individual supply of feed is possible in these systems. It is estimated that the production safety is reduced in feeding principles that do not provide this opportunity. (Report no. 618).

Space requirements

Legislation prescribes that there must be min. 1.3 m² solid floor per sow and 0.95 m² per gilt, and that there must be a continuous area with solid or drained floor or a combination of this with bedding. Drained floor is defined as solid floor where the slots constitute max. 10% of the floor. Drained floor is equalled with solid floor – i.e. it is part of the lying area on which bedding must be supplied. Drained floor is an area from which humidity can be drained in order to improve the hygiene of the lying area.

Electronic sow feeding

Gestation units with electronic sow feeding (ESF) are one of the systems that meet the requirements for production-safe housing for gestating sows (Report no 451) (Figure 1). The facilities are easy to fit up, and they are, at the same time, flexible in terms of the number of place units. However, electronic sow feeding makes heavy demands on the management, feeding and daily supervision of the sows.

In pens with electronic sow feeding, it is recommended to equip the pens with large nest boxes measuring e.g. 6 × 3.5 m (width × depth). It is an advantage to lower the nest boxes approx. 25 cm to be able to litter straw in moderate amounts without getting straw on the slatted floor.

It is possible to have rooting material permanently in the pen if approx. 75 kg straw are used per place unit/year. Straw also meets the sows' need for filling feed and bedding, and also acts as a buffer in relation to adjustment of temperature and humidity.



Figure 1
Example of a pen with group-housing and electronic sow feeding.

The facility can have a separation area, which facilitates work related to, for instance, vaccination, especially in dynamic groups. However, there is at the same time a risk of these auxiliary devices leading to serious accidents resulting in dead or injured sows due to incorrect location of the gate. Feeding stations with separation equipment must therefore have safety devices to avoid leading too many sows into the separation area. Alternatively, the feeding station can be equipped with one or more spray colours for marking of the sows to avoid separation.

Introduction/training of new animals

In connection with ESF, it is important that the gilts have learned how to use the feeding station on transfer to the gestation unit. There ought to be a separate training pen with a practice feeding station for the new animals. (Act no 0410)

The below points are recommended when training gilts/young sows:

- There must be a separate training pen for the young females
- Training must be completed before the young female is served
- Training is easiest in stable groups
- The young females must also gain social experience from e.g. being housed in dynamic groups, possibly with older sows. This could take place after a period of training in stable groups

- Within 3–4 weeks, the young females can "train themselves" without help from the staff. If a shorter training period is desired, they must be helped by the staff on a daily basis
- The training pen must be designed so it is possible to see which animals have used the feeding station
- The training pen must be designed like the pens in the gestation unit
- The trough and front gate of the training station must be controlled manually
- On transfer to the gestation unit, the gilts must be led through the feeding station, and must be housed with other gilts or young sows

One feeding and resting crate per sow

This feeding principle gives a good overview of the individual feed intake, and the sow is furthermore protected while it eats. A further advantage is that all sows in the pen can eat at the same time, which is their natural eating behaviour. It is only possible to give one basis ration, and therefore supplementing feed must be given to e.g. thin sows.

Pens with feeding and resting crates can have several layouts. The layout of the pen and the amount of bedding influence the sows' use of the area outside the crate, and the extent to which a good pen hygiene can be maintained. Results from several trials and experiences show that diurnal rhythm, climate in the housing unit and bedding are factors important to the behaviour of the sows. The clearer the division is between lying area and dunging area, the more sows will use the area as lying area, and the more options the producer has for using bedding. If more bedding is used, the area outside the crates will probably be used more.

It is recommended that pens with one feeding and resting crate per sow be equipped with T-pens (Figure 2), i.e. with the main part of the lying area in the form of a nest area located in one end of a pen with two rows of crates. Thereby the pen is divided into a well-defined lying area with solid walls and a dunging/activity area between the two rows of crates.

Flooring in pens with feeding and resting crates

The floor in pens with feeding and resting crates is often a combination of solid floor and slatted floor. The floor must be slip-resistant to prevent the sows from injuring their legs. It is possible for the solid floor, or part of this, to be made up of drained floor where the slots constitute max. 10% of the floor. The solid/drained floor must be



Figure 2
In a T-pen the area outside the crates can be divided into a lying area and a dunging area. Experiences from a herd with T-pens have shown that 50–75% of the sows use the solid floor outside the crates in the resting periods and that approx. 75 kg bedding are used per place unit/year.

coherent and bedding must be supplied. (Act. 0508 and report no 764 and 765)

Lactating sows

The traditional farrowing pen

The traditional farrowing pens are equipped with farrowing crates to control the sow's movements when it lies down and to avoid crushing of the piglets. It is estimated that the crates have played an important part in reducing piglet mortality significantly over the last 30 years. They make it possible for the pigs to evade the sow when she lies down, and the crates also support the sow when she is lying down. However, restricting the sow's freedom of movement can also cause injuries to the sow, and the farrowing crate can make it difficult for the piglets to access the sow's udder.

The Danish Applied Pig Research Scheme has studied the dimensions of crossbred sows. The dimensions found form the basis of new recommendations concerning dimensioning of, for instance, farrowing pens. Not only have the sows grown bigger during the last 20 years, there is also a tendency to a higher weaning age (from 4 to 5 weeks) and significantly larger litter size. In order to bene-

fit the space requirement of both sows and piglets, the farrowing crate and the traditional farrowing pen should be larger than the standard measures used in the 1990's. The covered creep area should also be bigger (Table 2).

A trial has been initiated to clarify the consequences of increased space for the sow and piglets. The increased space is expected to improve the production results and welfare of the animals, but also to increase costs and possibly reduce pen hygiene. (Report no 679)

Loose, lactating sows

Loose housing of sows in the lactation period is excellent welfare for the sows, but mortality among the piglets can be high and working conditions are considerably different from traditional farrowing pen. A great effort is being made these years to find methods that can reduce mortality.

Generally, the latest types of farrowing pens for loose lactating sows cannot be recommended. There is great potential for improvement in terms of, for instance, piglet access to the teats, support for the sow when it lies down, and freedom of movement for the sow. A considerable development task lies ahead before farrowing pens for loose lactating sows can be recommended.

The challenge lies in designing the farrowing pens with a number of conflicting considerations as the requirements for, for instance, immediate environment and design vary for sow, piglets and staff, respectively. The Royal Veterinary and Agricultural University, the Danish Institute of Agricultural Sciences and Danish Pig Production will continue the effort to develop pens that as far as possible meet needs of both sows, piglets and staff.

Overall, it was estimated that none of the six pen types met all of the above points. Some pen types worked well, while the layout of others restricted the sows' movements and had significant defects with respect to ensuring good lactating conditions. Furthermore, most systems for loose, lactating sows require more room than traditional systems.

The production safety and production results in pens where the sows are loose both during farrowing and for the entire lactation period are currently not good enough.

Table 2: Recommended measures of traditional farrowing pens

	Farrowing crate	Farrowing pen	Covered creep area
Width	Min. 90 cm	Min. 180 cm	0.8 m ²
Length	Min. 210 cm	Min. 270 cm (min. 210 cm from edge of trough to back gate)	

Sub-parts and pen concepts require continued development to ensure increased production results.

Publish with **BioMed Central** and every scientist can read your work free of charge

"BioMed Central will be the most significant development for disseminating the results of biomedical research in our lifetime."

Sir Paul Nurse, Cancer Research UK

Your research papers will be:

- available free of charge to the entire biomedical community
- peer reviewed and published immediately upon acceptance
- cited in PubMed and archived on PubMed Central
- yours — you keep the copyright

Submit your manuscript here:
http://www.biomedcentral.com/info/publishing_adv.asp

