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Removing Farrowing Pen Barriers when Keeping Nursing Sows in Crates

Animal Performance and Behaviour in Comparison to the Conventional System

Group housing systems for nursing sows, where piglets are confronted with non-litter mates before weaning and can establish their ranking, have not successful been in practice because of the increased numbers of crushed piglets, decreased piglet performance, as well as higher work input. On the experimental farm in Relliehausen the effects of removing the solid barriers between the farrowing pens, while leaving the sows confined in their crates, was compared with a conventional system. The goal of this study was to reduce the weaning stressors by earlier grouping in the nursing phase and to realize higher weight gains after weaning.

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Literatur

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The weaning of piglets is considered to be one of the critical phases in pig-keeping. Weaning under natural conditions takes place in a slow process lasting up to 12 weeks and involves a step-wise integration of the piglets into the family group. In conventional pig keeping, weaning is an abrupt experience, which places a high demand on the piglets for adjustment [1]. In addition to separation from the mother, a sudden change in surroundings and the abrupt change in feeding, which accompany the weaning process, being confronted with piglets from a foreign litter especially places great demands on the ability of the animals to adapt [2, 3]. The direct consequences are an increased occurrence of aggression, reduced intake of food directly following weaning and, linked to this, a depression of growth, which has wide ranging consequences [4].

There are reasons to believe that the aggressive behaviour of the piglets changes with increasing age [5]. Studies have shown that that fights to establish a hierarchy amongst young piglets are shorter than is the case with older animals [6, 7]. Moreover, piglets which have been socialised already during the first weeks of life, with piglets from foreign litters, have fewer injuries following separation than piglets first mixed at the age of 26 days [7]. The main effect of mixing during the suckling phase is to reduce aggression between the piglets following separation [8, 9]. Reduced aggression between piglets in the first few days after separation has a positive effect on the development of weight. Consequently, the piglets spend less time in establishing a new ranking and more time eating food, which plays a fundamental role especially in the first few days following separation [8, 9, 10].

In the research presented here, the behaviour and performance of piglets that were mixed on the twelfth day after birth by opening the pen partitions, with continuous fixation of the sows, was compared with the behaviour of animals that grew up during the suckling phase under conventional conditions.

Animals, materials and methods

There were two weaning compartments, each with six pens, as well as a rearing compartment with four pens available for carrying out the study. The compartments were not littered with straw and were automatically ventilated.

The pens in the farrowing compartment were provided with conventional sow boxes, which were laid out diagonally. On the twelfth day after the calculated date of birth, the partitions between, in each case, three of the pens of both compartments were removed, with continuous fixation of the sows, so that the piglets had the possibility of moving freely between the pens (experimental group). In the three remaining pens of the

Table 1: Definition of observed behaviours

Behavioural features	Definition
Farrowing compartment	
Lying	Piglet lie in piglet nest or on the floor with slits
Suckling	Piglets massage or wean from the nipples of the sow
Activity	Piglets stand or run around
Rearing compartment	
Lying	Piglets lie in the resting or activity area
Activity	Piglets stand or run around
Eating	Piglets stand at the automatic feeding device and the head juts into the trough
Agonistic behaviour	At least two piglets display physical confrontation (mutual sucking or biting)

farrowing compartment, the litters were kept separate from one another (reference group). In order to allocate the piglets belonging to the research groups to their original farrowing pens, they were marked according to the pen of origin. At the time when the partitions were opened, the animals had an average weight of 3.72 ± 0.09 kg.

Following the suckling period of, in total, 28 days after the calculated date for weaning, the piglets were weaned and transferred to the rearing pen. The three litters of the respective groups remained together, even after weaning.

The behaviour of the piglets was documented both in the farrowing compartment, as well as in the rearing compartment, as were the increase in weight of the piglets and the integument of the animals.

The evaluation of video recordings from both compartments was carried out with the aid of the timesampling method (four-minute interval) on selected days (24 to 0 h before opening the partitions, 0 to 48 h after opening the partitions, 0 to 48 h following weaning). *Table 1* shows the features of behaviour of the animals taken into account in the evaluation.

In order to investigate the question of suckling by outsiders and the proportion of outside and own piglets in the experimental group, direct observations were made in addition to video monitoring in the farrowing compartment. The direct observations were made immediately after opening the partitions, on the ninth day after opening and two days before weaning the piglets, in four-minute intervals of each 60 minutes duration.

In order to be able to compare the development of weight of the piglets between the experimental and the reference group, the increase in weight of the piglets was ascertained. The weight of individual animals was ascertained, in each case, on the fifth day after reaching the calculated date of birth, immediately before opening the partitions, immediately before weaning and then weekly in the rearing compartment.

Parallel to weighing, the integument of the suckling pigs was examined on each weighing, based on a classification and appraisal sheet. A number of parameters were recorded, which were subdivided according to body region and the seriousness of the occurrence. On the first weighing in the rearing compartment, the animals were examined for any injuries that may have arisen from fighting to establish a hierarchy.

Data obtained from, in total, 16 sows and 231 piglets were available for analysis. The statistical evaluation of the data was carried out with aid of the program SAS (SAS Inst. Inc., Cary, NC, USA). Data that showed a normal distribution or which could be transformed to a normal distribution were analysed with the procedure GLM. Data that could not be transformed to a normal distribution were evaluated with the aid of the Wilcoxon Test, making use of the procedure NPAR1WAY.

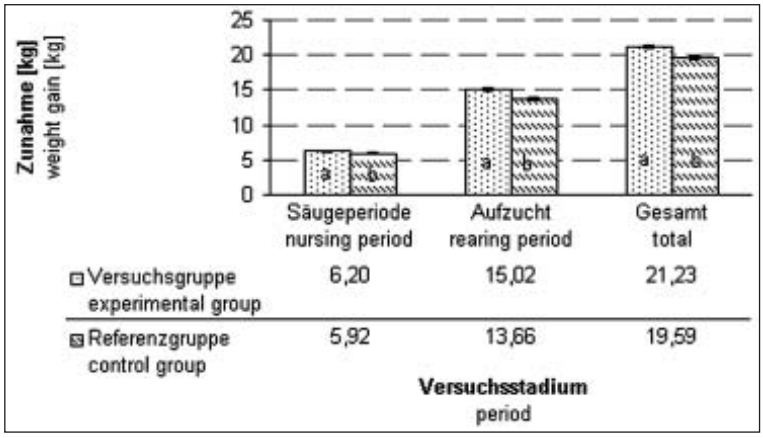

Fig. 1: Least square means and standard error of the body weight gain of the piglets [kg] in the different periods, as a function of treatment

a, b: where the letters are not identical within a suckling pair, the increases in weight differed significantly from one another ($p<0.05$)

Results and discussion

No negative effects of opening the partitions on resting and active behaviour of the piglets were seen. Moreover, there was no evidence of suckling by outsiders. Following weaning, hardly any aggressive confrontations were observed in the experimental group. With a value of 1.46 %, the proportion of aggressive animals in the experimental group was, in the first four hours following weaning, clearly lower than in the reference group, where the proportion of fighting animals was 6.32%. Hand in hand with reduced aggressive confrontations, the piglets in the experimental group exhibited a more distinct resting behaviour than the animals in the comparison group.

Also, with reference to the increase in weight during the suckling period, no effect of grouping was observed. Following weaning, in contrast, a clearly positive effect of early mixing could be identified. With an increase in weight of, in total, 1.01 kg, the animals belonging to the experimental group, in the rearing compartment, showed a significantly higher increase in weight than the piglets in the reference group. When the whole period of the study was taken into consideration, there was an increase in weight of 1.09 kg in the experimental group (*Fig. 1*).

Examination of injury to the integument of the piglets in the experimental group directly before weaning revealed significantly more injuries in the head region and the snout. Also, in the neck/shoulder area, the animals belonging to the experimental group had more injuries than animals in the reference group, but these results could not be substantiated by statistical analysis. The increased injuries in the neck and shoulder region allow one to infer an influence of opening the partitions.

In the classification and appraisal procedure, which was undertaken one week after weaning the piglets, only in 4.35% of the piglets in the research group could conspicuous features be established whereas, in the reference group, changes to the integument were seen in 43.97% of animals. The conspicuous features observed were small scratches or grazes on the ears and in the shoulder region of the piglets, which could be traced back to confrontations related to the establishment of a ranking.

Conclusion

The grouping of piglets during the weaning phase, with the sows continuously fixated, had no effect on the development of weight and behaviour of piglets: the piglets did not suckle from a different sow. As a result of early mixing, it was made possible for the piglets to establish a new ranking already before weaning. After weaning, piglets that were socialised already before the suckling phase showed clear advantages, both in relation to the development of weight as well as also their behaviour.

The system presented here represents, with the aid of a simply modification, a sensible solution in order to minimise weaning stress and so to both optimise conditions to the needs of the animals, as well as to achieve economic success in pig-keeping. It remains to be established whether, in the case of larger farrowing compartments or opening the pen partitions of more than three farrowing compartments, variations may occur.