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# Housing of sows in modified farrowing pens

## Labour efficiency aspects

*Investigated were the labour efficiency effects of improved freedom of movement for nursing sows. Under the given trial conditions, there appeared no appreciable difference in total labour requirement between the pen types giving the smallest movement possibilities and those allowing the greatest. There were differences, however, in the dividing of the work involved. In the free-movement pen, for instance, regular cleaning could be dispensed with, although the time involved for all procedures in that system was greater. To be striven for in such systems is a simple way of confining sows to one spot when this is required.*

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Up until now, piglet production in Germany has been characterised through modernisation with direct economic advantages. In the farrowing pen, a strawless system with farrowing crate and confinement of sow became accepted. This system offered efficiency of labour and an economical biological productivity. On the other hand a lot of work [1, 2, 3] indicates that confinement in a crate restricts the expression of natural behaviour. During modernisation in the sow housing of the Relliehausen research station of Göttingen University, realistic production-technological alternatives to the conventional system were therefore considered.

The aim of this research was to investigate the labour-efficiency consequences of adopting such farrowing pens offering the sow improved freedom of movement.

### Experimental housing

Available for the experiment were four sow housing departments completed at the beginning of 1999, each containing six strawless-system single sow farrowing pens. Each of these research units were of the ground plan and had a similarly-built, individually-controllable, pore-canal ventilation (Fanco, Netherlands) supplied with air from the heatable access passage. The basic equipment in the pens is largely identical for every department. Only slight modifications were carried out in the prefabricate pen equipment (Laake, Langen) for the trial variants.

The differences between the housing departments were thus confined to the movement possibilities for the sows, as well as heightened pen walls and additional piglet protection railings in departments 2 to 4.

The differences according to the variants were:

- Department 1: conventional farrowing crate, confinement of sow until weaning
- Department 2: As department 1, but with farrowing crate opened after piglet castration (~ 10th day)
- Department 3: Free-movement pen. Possibility of confining sow with moveable piglet creep protection gate



Fig. 1: Free-movement pen for single sows in farrowing department (variant 3) and possibilities for confining the animal

- Department 4: As department 3, but with no possibility of confining the sow
- In that the possibility of confining the sow in department 3 was not used by the staff, departments 3 and 4 can be regarded as variant 3 in the following presentation. This pen type is presented in figure 1.

Each of the four departments were used in an all-in, all-out system. The penned sows were of different races or crosses divided between the variants according to chance.

Currently, three staff members are employed in the entire pig unit of the experimental station. To enable a standardised comparison, the work of these people was not individually confined to a separate routine, nor to a separate department of the unit.

### Methodology of labour assessment

The determination of the working time involved followed a phase over several months during which staff members were given time to become used to the new situation. In a first step, the working procedure within the respective departments was investigated and the total work divided [4] into separate work elements, as described in [5].

Following this, timing was carried out with a stop watch and the results recorded by hand [6]. In this way all tasks, with the exception of control and observation times, were recorded which take place in the routine of a farrowing unit. In the first place, this

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	Frequency	Variants		
		1	2	3
Feeding of sow twice/day	42	511,7	577,6	554,6
Feeding of piglets	12	62,3	65,7	70,1
Rough cleaning of pens	max. 5	87,7	113,3	0
<i>Routine tasks</i>		661,7	756,6	624,8
Penning <sup>2)</sup>	1	65,5	46,9	16,2
Weaning piglets	1	19,7	22,3	19,8
Giving an injection	1	8,5	36,6 <sup>3)</sup>	36,6 <sup>3)</sup>
<i>Special tasks, sow</i>		93,9	105,9	72,7
Catching of ten piglets for treatment	1	39,5	33,7	86,5
Sorting for treatment	1	35,2 <sup>3)</sup>	35,2 <sup>3)</sup>	35,2 <sup>3)</sup>
Treating the ten piglets <sup>4)</sup>	1	818,5 <sup>5)</sup>	818,5 <sup>5)</sup>	818,5 <sup>5)</sup>
Castrating five piglets	1	257,7	234,6	320,0
Re-penning piglets <sup>5)</sup>	1	177,6	168,0	159,0
Removing dead piglet	1,5	9,7	30,7	38,5
<i>Special tasks, piglets</i>		1364,0	1348,0	1481,5
Opening grating (only var. 2)	1	0	173,0	0
Closing grating (only var. 2)	1	0	105,9	36,5
Final cleaning <sup>6)</sup>	1	16,0	42,7	36,5
<i>Special tasks, pen</i>		16,0	321,7	36,5
<i>Special tasks, total</i>		1473,9	1775,6	1590,7
<b>Total labour time</b>		<b>2135,7</b>	<b>2532,4</b>	<b>2215,5</b>

Table 1: Labour requirement(s) for nursing sows in association with the freedom of movement for the sow (data relating to an average sow with 10 piglets with weaning at 21 days)

- 1) All statistics are without preparation times.
- 2) Time from entering the department to closing of the pen door.
- 3) Work that has taken place outside the department is detailed under the appropriate variant.
- 4) Time includes the tattooing, weighing, tail and teeth clipping as well as iron injections.
- 5) Catching, weighing, placing in cart, sow already re-penned.
- 6) Pre-cleaning of empty pen, before application of high pressure cleaner.

includes data collected outside the farrowing department, that is, for operations that have no direct association with the type of housing (such as piglet tattooing, without catching and weighing). Secondly, some of the operations were observed on a department basis (weaning litters). Finally, the third characteristic group of observations referred to times that had to be apportioned according to pen (catching piglets, for example).

## Results and discussion

The recorded working times are presented in table 1 and analogical to the presentation [5], arranged into total, routine and special task times. For this reason, the recording results were first of all divided according to pen type and work description. Afterwards, these results were multiplied by the necessary frequency of the tasks during a lactation (for instance, sow feeding = 42 times) and the individual tasks finally added-up under the working time group headings.

It is clear that, with regard to the total time involved, there is almost no difference between the variants with the smallest and those the greatest freedom of movement for the sow. In the end, the second variant demanded an increased work input. The grounds for these observations shall be presented in the following text within a breakdown of total work involved.

With the routine tasks, hardly any difference was determined between the pen variants. The reason for this was that the biggest share of work in this task group concerned

feeding which, in the sow unit described here, involved feeding from the passage which represented the same effort for all variants.

With the comparatively less important time for regular cleaning, the free-movement pens demonstrated a notable advantage. Here, the high activity of the sows led to continually clean pens that only got dirty under the piglet protection railings to a differing extent depending on the individual litters. It was therefore possible to restrict mucking-out to the final cleaning after re-penning. From this point of view the results of [7] are different in that they primarily express a different

cleanliness requirement and possibly also a few differences in standard pen design. In the work here presented, the crates were to be cleaned five times on average and, in variant 2, regularly up to the opening of the crate. In this work the high pen walls were a substantial hindrance.

The sow-specific special tasks began with the penning. In order to eliminate the influences of the site-specific circumstances, the time involved here was only recorded inside the department in question. Two factors influenced the recorded results. The high pen separation walls of variant 2 and 3 led to a reduced time requirement in that the animals were, firstly, less distracted by outside influences and, secondly, easier to get a hold of. Additionally, the absence of a crate in variant 3 led to a further simplification of the penning operation. Compared with this, the weaning of the litters resulted in no mentionable difference between the pen types.

Finally, these time groupings included possible treatment procedures. These showed the notable advantages of the farrowing crate variants. For example, the injection of all sows in the free-movement pens for induction of the next heat had to take place in the insemination crate whereas the sows in variant 1 pens were quickly injected in their farrowing crates. The possibility of confining the sow in variant 3 pens was not utilised. The reason for this was, firstly, the considerable resistance of the adult animal to such an action. Additionally, the effort involved in the detachment of the rear railings was too much. The design of this mechanism was due to efforts to make the equipment in all pens almost identical.

The conventional farrowing system added to the considerable ease of several piglet-specific special tasks. For example, the catching of piglets for treatment outside the department in the first week could be done with just one person whilst, with the free-movement pens, two people were required. Especially in this early phase of development of the young animals, and with the highly developed protective sense of the mother animals, the farrowing crate offered a high degree of work safety, a criterion that could not be gone into more thoroughly during the present investigation.

The castration routine also took place much faster where the sow was in a farrowing crate. The time requirement noted in the table involved the catching, castrating, and returning to the pen of five piglets. A similar situation involved the removal of the dead piglet from the pen. In the farrowing crate pen, this operation can be simple. Decisive for the evaluation of the variant 2 is whether the piglet died before, or after, the opening of the crate.

The pen-specific special tasks represented only a very small portion of the total working time. Remarkable here is the great time expenditure for the dismantling of the farrowing crates in variant 2, an observation which indicates the demand for the development of a system which can be handled more speedily.

## Conclusion

Under conditions prevailing in the investigation, the keeping of individual sows in free movement pens caused no special extra effort. For sow treatments as well as for the catching of piglets, there is a demand – for efficiency of labour and for work safety – for the development of a mechanism with which the sow can be secured quickly and safely.