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Behaviour of breeding sows in natural climate housing

Altered legal regulations require loose housing of sows in groups and more space per sow in dry sow accommodation. This increases the advantages of simple, cost-efficient production systems. In a practical trial the behaviour of pregnant sows in a natural climate house with lying huts was recorded. Here it could be observed that the production system investigated fulfilled requirements with, however, special values having to be used when considering the grouping of the sows.



Fig. 1: Video image with xy-coordinates of all animals taken over 48 hours in pen 1

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Keywords

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The investigated dry sow housing comprised a steel frame building with trapezoid galvanised metal roof panelling, continuously open roof ridge and open gables. The 144-place pens were situated across from each other, running parallel to the roof ridge for 12 groups of 12 pigs. Each pen was divided into three areas: a walled lying hut, solid floored dunging and activity area and 12 closable single feeding stands.

House and production system

The walled lying huts (2•6 m, 1 m² per pig) were 1.45 and 1.80 m high. The lying area was surfaced with a 5 cm hardfoam insulated cement layer raised 0.2 m above the dunging area surface and not littered. The walls, of 0.24 m deep holed bricks were unplastered inside and plastered outside. Entrance was a 0.80•1.50 m featuring a strip-curtain of fibre-reinforced transport bands. The transpiration-porous roof allowed moisture dispersal and comprised building steel matting with woven plastic covering and an added layer of 0.1 m loose straw. In summer the straw and plastic were removed. For reducing labour, dust and mouse problems, this was being replaced step by step.

The single animal feeding stands (0.5 m wide) were 0.2 m lower than the adjacent feeding passage and 0.2 m higher than the dunging passage. The trough drinkers were used during feeding time. Dry feed delivery

was via chain and flight system linked for distribution to volume rationers, one for every two feeding places.

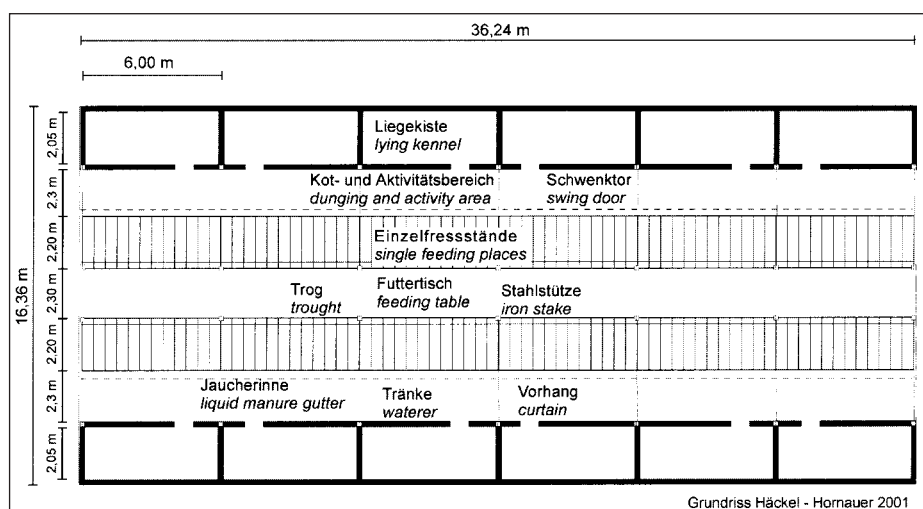
The dunging and activity area lay between the feeding area and the lying hut and featured a 1% fall to the „green channel“. The drinking nipples were positioned at 0.9 m height integrated into the wall of lying hut wall. Both dunging passages were cleaned twice weekly with a tractor and scraper with dung shoved onto an apron. This operation was followed by littering (~ 300 g per place and day). Additionally straw was daily placed in the troughs so that the sows could help themselves.

Recording methods

In summer (July) as well as in autumn (October) animal behaviour was recorded in a total of four groups (in each case two adjacent pens), whereby animals in groups 1 and 3 had in each case been together for already several weeks and farrowed together whereas group 2 comprised animals brought together out of two groups three days before the trial period and group 4 consisted of gilts which had been together for some time. The groups were digitally filmed in second-rhythm every 48 hours by two cameras linked to a PC with photo-processing software. Minimal lighting installed in the middle of the house applied night-times (intensity 0.6 to 1.8 lux). The evaluation was car-

Table 1: Animal behaviour in functional areas – July – old vs. young group

	Group Number		Behavioural proportion (%)						
			Total	Standing	Feeding	Lying (side)	Lying (belly)	Sitting	Drinking
Drinkers	1	37	0.29	0.00	0.00	0.00	0.00	0.00	0.29
	2	23	0.20	0.00	0.00	0.00	0.00	0.00	0.20
Doors	1	8	0.06	0.06	0.00	0.00	0.00	0.00	0.00
	2	13	0.11	0.11	0.00	0.00	0.00	0.00	0.00
Between areas	1	36	0.28	0.28	0.00	0.00	0.01	0.00	0.00
	2	29	0.25	0.25	0.00	0.00	0.00	0.00	0.00
Dinging passage	1	3832	30.24	4.51	0.02	10.38	15.02	0.32	0.00
	2	6531	56.69	6.29	0.01	24.49	25.66	0.23	0.00
Feeding stand	1	426	3.36	2.19	0.03	0.02	1.10	0.02	0.00
	2	489	4.24	1.61	0.01	0.00	2.63	0.00	0.00
Trough	1	1198	9.45	0.20	9.1	0.00	0.08	0.00	0.00
	2	604	5.24	0.69	4.19	0.01	0.36	0.00	0.00
Outwith the lying hut	1	5501	43.41	Spot check extent		12672	11 Animals		
	2	7659	66.48			11520	10		



Grundriss Häckel - Hornauer 2001

Fig 2: House ground plan

ried out via the multimoment system (photograph interval 150 seconds) using Excel data sheets. For every pig, this enabled automatic recording of xy coordinates in the photograph as well as the classifying of various behavioural parameters (standing, feeding, laying, sitting, drinking).

Surveys of pen dirtying gave additional information on dunging behaviour and the functionally correct use of the different function areas especially lying and dunging ones.

Results

Between May and December the temperatures in the lying huts were always in the tolerable range for the pregnant sows of between 10 and 30°C. During behavioural observations in the first trial phase, the average temperatures with standard deviation were 19.0 ± 5.3°C for the house, 21.6 ± 3.4°C for lying hut 1, and 21.0 ± 4.2°C for lying hut 2. During trial period 2 in October the average house temperature was 12.0 ± 2.9°C, in lying hut 3 23.0 ± 1.4°C and hut 4 22.2 ± 1.2°C.

Because of the good free ventilation, the house interior ammonia concentration, recorded via a Dräger Polytron, mostly lay under 1 ppmV or even under the provable threshold.

Listed in tables 1 and 2 are the relative frequencies of the recorded behavioural characteristics and their distribution in the separate function areas outwith the lying huts. During the first trial phase the sows that had lived with one another for longer periods spent 43.4% of their time outside the lying hut (table 1) during which they lay mainly in the littered dunging and activity areas. The proportion of time spend for the characteristic „feeding“ was notably high at 9.1%. Above all, this could be traced to the time spend employed at the trough and feeding table with the always available fresh straw.

The evaluation for group 2 indicated these animals were much more frequently outside the hut (66% of time) or many more sows were outside. This was due to the ranking relationship of the sows which in part has not yet been explained. The sows in this group also went to the feeding stand more often,

without actually bothering with the feed or straw there.

A comparison of pig-positions in pens of both groups showed there were higher pig concentrations of group 2 in the eastern area of the dunging passage, further distanced from both activity areas „door“ and „drinkers“.

The sows in group 1 were very much quieter and more relaxed; the periodical behavioural recordings indicated more continuity and a substantially two-phase activity procedure clearly reflecting natural behaviour. The straw available at the feed table was sufficient to supply requirements for occupation and rooting. In group 2 these activity phases were overlaid by ranking fights. The occupying of the pen areas was more consistent which indicated greater distance between individuals. However, the special structure of the pens offered sufficient flight and withdrawal possibilities.

With comfortable day temperatures over 10°C an even distribution of the animals over the whole pen could be observed. On the contrary, during the nights with temperatures around or under 10°C saw sows mainly retiring to the lying hut with its heat radiating construction components.

The behaviour of the sows in trial phase 2 (groups 3 and 4) differed substantially from those in phase 1 because of the much cooler temperatures. The animals were to be found only about half so frequently outside the lying hut (table 2) which was already covered with straw in this phase. In total, the group 3 animals with older sows spent just under 3% more time outside the laying hut compared with group 4 which consisted of young gilts. This difference, however, was only caused by one young sow that was not allowed into the laying area by its pen mates.

The lying huts were not dunged in. As the name indicates the dunging area was used for depositing excreta by the pigs. As is indicated by the height profile this took place mainly at the split pen gates and in the dunging passage along the lying hut walls.

Summary

In the investigated natural climate building the sows indicated a typical two-phase procedure for daily activities. Over long periods activity with straw could be observed.

With newly grouped animals and with individual gilts there were greater distances between the animals to be observed. Against this, stable groups of sows showed a relaxed and quiet behaviour. The space in the lying huts of 1 m² per animal was sufficient.

Table 2: Animal Behaviour in functional areas – October – old sows vs young gilts

	Group	Number	Behavioural proportion (%)						
			Total	Standing	Feeding	Lying (side)	Lying (belly)	Sitting	Drinking
Drinkers	3	31	0.22	0.01	0.00	0.00	0.00	0.01	0.21
	4	33	0.24	0.00	0.00	0.00	0.00	0.00	0.24
Doors	3	26	0.19	0.19	0.00	0.00	0.00	0.00	0.00
	4	37	0.27	0.26	0.00	0.00	0.00	0.01	0.00
Between areas	3	33	0.24	0.24	0.00	0.00	0.00	0.00	0.00
	4	13	0.09	0.09	0.00	0.00	0.00	0.00	0.00
Dinging passage	3	1894	13.70	5.42	0.00	0.90	7.00	0.38	0.00
	4	2428	17.56	8.75	0.00	2.55	6.16	0.12	0.00
Feeding stand	3	850	6.15	1.70	0.16	0.00	4.15	0.15	0.00
	4	670	4.85	2.53	0.00	0.00	2.30	0.02	0.00
Trough	3	822	5.95	0.01	5.92	0.00	0.00	0.01	0.00
	4	849	6.14	0.00	6.10	0.00	0.00	0.00	0.00
Outwith the lying hut	3	3623	26.21	Spot check extent		13824	12 Animals		
	4	4017	29.06			13824	12		