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Piglet rearing with tube mash feeder or interval feeding?

Compared for suitability with rearing piglets during two trial feeding periods was a newly developed interval mash feeder and a conventional tube mash feeder. Using the interval mash feeder led to no improvement in rearing performance but did result in increased feed consumption. Animal behaviour was also significantly influenced by the feeding system used.

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Piglet production, piglet rearing, feeding technology, interval feeding

Following the presentation in an earlier paper on rearing piglets [1] where sensor controlled liquid feeding from a short trough was described, compared within the following study is a conventional tube mash feeder and a newly developed interval mash feeder. Applied as crieria were characteristics of piglet behaviour and performance.

Production system

The trials took place with two consecutive batches in a ridge roof house with six compartments. For the trial two large pens in each of two compartments with a ground area in each case of 14.66 m^2 were created. In each of these pens 40 piglets were housed giving a per animal space of 0.366 m^2. Exact measurements are given in the plan elevation *(fig. 1)*.

In one of the two trial pens per compartment was situated a conventional tube mash feeder (Lean Machine, Big Dutchman, Calveslage) with the other pen in each case being fitted with an interval mash feeder (a prototype from Atka, Lohne).

The tube mash feeder supplied the piglets continually with feed with the pigs mixing it in the trough (d = 400 mm) with water from spray nipple drinkers. The interval mash feeders supplied feed every 30 minutes during the period from 6 am to 11.30 pm. The feed was deposited via auger and during feed deposition water was simultaneously dosed into the trough (d = 600 mm).

The entire house was managed as a single unit under all-in, all-out system. The piglets were ~ 21 days old at housing. They were removed from the house at a lw of ~25 kg. Sexes were penned separately.

Recording and evaluating characteristics

For recording behaviour time-lapse videos were taken during one day per week. Camera positioning can be seen in the plan elevation *(fig. 1)*.

From these films anonymous data on piglet feeding behaviour was recorded using scan sampling. For this the films from one day (0.00 to 23.56) in every rearing week were evaluated in 4 min. intervals.

Per pen, ten animals were clearly marked for individual observation purposes. The behaviour evaluation of these focus animals was limited to four days per feeding period with observation intervals of 4 minutes.

Additionally, production environment information was continuously (air temperature, relative air moisture content) or intermittently (indoor ammonia concentrations, air velocity, pen cleanliness) recorded, as was piglet dlwg and feed consumption.

Data recording and organisation was through Microsoft Excel 2000 table calculation program with subsequent evaluation with the statistic program SAS 8.01.

A detailed representation of the trial methods as well as statistical data analysis is available in [2].

Biological performances

The dlwg of the piglets is shown in *table 1.* Comparing the two feeding systems indicated no higher dlwg attained with the new de-

Table 1: Body mass development depending on batches and feeding system

		Feeding batch I		Feeding batch II	
		Interval	ad libitum	Interval	ad libitum
Housing wt. [kg/animal]	LSM	6.3[b]	6.8[a]	6.1[b]	6.0[b]
	SE	0.12	0.12	0.12	0.12
End of period wt. [kg/animal]	LSM	23.1[b]	25.0[a]	25.3[a]	25.2[a]
	SE	0.47	0.48	0.46	0.46
development depending Growth [kg/animal]	LSM	16.8[b]	18.7[a]	19.0[a]	18.9[a]
	SE	0.47	0.48	0.46	0.46
system dlwg.[g/d]	LSM	330.4[b]	366.8[a]	388.0[a]	386.6[a]
	SE	9.3	9.6	9.23	9.22

LSM, least squares means; SE, standard error; Values in a line showing no identical upper letter differ significantly ($p<0.05$). No upper letters in a single line indicates differences are not significant

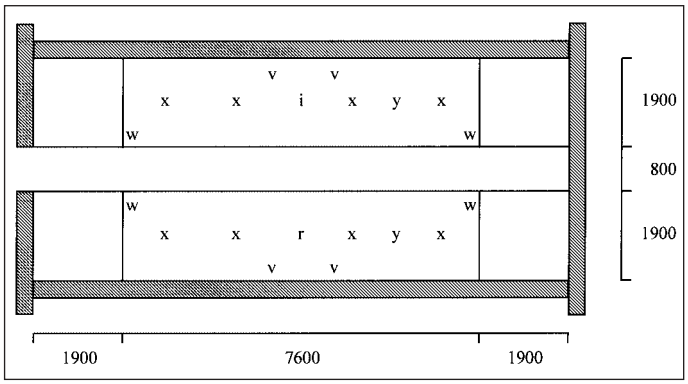

Fig. 1: Ground plan of an experimental compartment, measures in mm. i interval mash feeder; r tube mash feeder/ad lib feeding; v video camera; x measuring points for discontinuous climate measuring; y measuring points for measuring air humidity and temperature

veloped interval mash feeding compared with the conventional ad lib. feeding with the tube mash feeders. In fact the interval system resulted in poorer dlwg performance in the first feeding batch.

Independently from the influence factors mentioned, biological performance was relatively low during both trial feeding periods and in this context health problems had been reported by the unit manager during the trial periods.

In both feeding periods, independently of trial compartment, substantially more feed was used with the interval mash feeders. In period I the growth related feed consumption from the interval mash feeders was 1.96 kg and with the tube mash feeders 1.53 kg per kg lw gain. The corresponding figures from feeding period II were 2.05 and 1.59 kg respectively.

A possible reason could first of all have been the sub-optimum design of the feed troughs in question (large diameter, design of lip, lack of feeding place divisions) and associated feed waste. Secondly, the rationing method (no sensor in trough, no daily periods) could be open to criticism. This system rationed out feed even where demand was not in evidence which also added to the feed waste. The situation was exacerbated by the unit manager's admitted action of increasing the amount of feed dosed in each feeding interval during the second feeding period with the aim of preventing batch members from growing away from one another in liveweight. This point of view was confirmed by the better weight gain in feeding period II on the one hand, and on the other, by the increased amount of feed used.

The same number of piglets was reared in both feeding systems.

Animal behaviour

Presented in *table 2* is the behaviour of the piglets with information gathered through observation of anonymous animals. A statistical evaluation given separately for both feeding periods showed a significant ($p<0.05$) or highly significant ($p<0.01$) influence of feeding system on all characteristics given in table 2. The only exceptions were the characteristic „sucking" in period I and „biting" in period II.

Noticeable when comparing the feeding systems was that with the interval system clearly less animals were observed feeding, and more animals observed showing interest in feeding. In interval feeding during period I there was an increased amount of aggression observed in the form of biting whereby the more restrictive feeding management in period I should be noted.

Table 2: Behaviour of piglets depending on batches and feeding system; results of the anonymous behaviour observation

		Feeding batch I		Feeding batch II	
		Interval	ad libitum	Interval	ad libitum
Feeding [kg/animal]	Avg	40.3	49.8	37.9	42.7
	±	21.52	19.75	19.33	14.37
Interest in feeding	Avg	14.4	11.2	10.6	7.4
	±	12.33	9.37	7.75	7.45
Sucking, active	Avg	0.2	0.3	0.1	0.3
	±	0.69	0.64	0.28	0.59
Biting, active	Avg	2.8	1.0	0.9	0.9
	±	3.37	1.26	1.21	1.08
Active behaviour [1)]	Avg	3.1	1.3	0.9	1.2
	±	3.56	1.42	1.25	1.30
Passive behaviour [2)]	Avg	2.6	1.2	0.9	1.2
	±	2.99	1.31	1.16	1.26

Evaluation according to data aggregation. Totalled per 15 number batches in 4 min. intervals. Presented here is the frequency of the action in each case during one hour per pen based on trial average.
Avg, crude material value = standard error
1) Number of piglets which either bit or sucked others;
2) Number of piglets either bitten or sucked by others.

The evaluation of dlwg and anonymous behaviour data for the group of the focus animals indicated that the selected animals were a good representation of the trial pigs as a whole. The behavioural data of the focus animals confirmed that piglets which were observed frequently feeding also grew faster than their group companions. There were, however, many exceptions to this observation. This relationship could not be determined regarding aggressive behaviour.

Following the observation that more feeding activity was observed at the tube mash feeders, the focus animals additionally indicated that this applied to fast growing as well as slow growing piglets.

Production environment

The recording of the different environmental parameters in production confirmed that firstly house climate and pen cleanliness gave excellent production conditions and, secondly, as far as possible identical trial conditions for comparison of the feeding variants. For this reason a thorough presentation will not be given at this point.

Summary

In summary, this report confirms that the concept of interval feeding of piglets does not fundamentally offer a procedural technological improvement compared with the proven tube mash feeder. If an actual advantage is to be achieved with the interval feeding compared with the ad libitum system then it is very important that a feed rationing system be developed which offers low-loss feeding according to demand. There was also room for improvement in the trough design of the prototypes tested here.

Literature

[1] *Snell, H., R. Schlichte und H. Van den Weghe*: Ferkelaufzucht in Großgruppen – Sensorfütterung, Tierverhalten und biologische Leistungen. Agrartechnische Forschung 7 (2001), S. 99-104
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