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Tube Feeders for Piglet Rearing

Comparing of two Feeders regarding Biological performance and Behaviour of Piglets

Two tube mash feeders were compared. LeanMachine has a round trough and feed dosage is measured through the movement of horizontally arranged bars above the trough. PigNic has a rectangular trough with three bowls, with a centrally arranged metering ring. The feed here was considerably drier than in the variant compared. Piglets at the LeanMachine feeder ate more frequently than in the compared system to gain the same amount of weight. Regarding aggressive behaviour and suckling each other, there were no significant differences.

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Keywords

Piglet rearing, feeding technology, tube mash dispenser

Several process-technological solutions are available for the feeding of weaned piglets. The concrete designs of the tube feeders are extraordinarily diverse and may exert significant effects on animal behaviour and biological performance.

Therefore, it seems appropriate to consistently improve existing systems on the basis of scientific insights in addition to searching for fundamentally new concepts. For this reason, the present study compares a newly developed tube feeder with a long-proven standard solution.

Animals, Material, and Methods

On the experimental farm of the University of Göttingen in Relliehausen two types of tube feeders were compared over four fattening periods in two piglet rearing compartments featuring two trial pens each (*Fig. 1*; 0.413 m^2 per piglet). The main difference between the feeders was the form of feed dispensing. Both feeder types were products of one manufacturer (Big Dutchman, Vechta).

Housing System and Feeding

The piglets were weaned at the age of ~ 28 days. Subsequently, 30 piglets each were stalled up in mixed-sex rearing pens. After 7 to 8 weeks, the animals were stalled out at an average body mass of ~ 30 kg.

During the rearing period, the piglets were fed pelleted complete feed (Hemo, Scheden). The goal was to feed the piglets ad libitum. During the batches D_I and D_{II}, however, this condition was not always fulfilled.

One trial pen in each compartment was equipped with a feeder of the type LeanMachine [1, 2]. The feed was metered out through the movement of two opposing, horizontally arranged bars in the middle of the feeder. Design and arrangement of the drinker nipples guaranteed thorough moistening of the metered-out feed.

In the other trial pen, a feeder of the PigNic type was installed. It featured a rectangular trough consisting of three parts. The metering equipment was situated directly above the middle trough and consisted of a height-adjustable live ring. A turning movement initiated by the animals resulted in feed being dispensed into the trough bowl.

On the longitudinal axis of the feeder, one drinking bowl each was arranged on both sides of the feed bowl, above each bowl one spraying nipple was installed in a vertical position. Feed moistening required the transport of feed and water between the bowls. Therefore, the piglets generally ate largely dry pellets.

At least 6 and 4 piglets in the 25 to 30 kg body mass range were able to eat simultaneously at the tube feeders LeanMachine and PigNic, respectively. Thus, a ratio of 5 to 7.5 animals per feeding place was calculated for the mentioned feeders.

Data Collection

Video recordings of the animal behaviour were carried out once a week over a period of at least 24 hours. These recordings were evaluated in 4 min intervals using the scan sampling technique. Eating and social behaviour were observed. These data were aggregated such that one observation per hour was

Table 1: Eating behaviour of piglets depending on batch and feeder type

		D_I		D_{II}		D_{III}		D_{IV}		Total	
		L	P	L	P	L	P	L	P	L	P
Observ.	n	377	352	336	310	260	254	300	300	1273	1216
Eating	Avg	40,6	32,3	49,9	38,0	35,0	35,5	40,0	37,1	41,8	35,6
	±	29,4	23,7	29,6	28,0	24,9	22,5	28,1	23,8	28,7	24,8
Interest	Avg	8,1	6,8	10,1	8,0	10,3	6,4	7,0	5,2	8,8	6,6
	±	12,0	8,3	12,7	10,2	12,2	7,4	9,3	6,9	11,7	8,4

Evaluation after data aggregation. 15 counts each in a 4 min interval were summed up.
D, rearing period; Total, total of the rearing periods D_I, D_{II}, D_{III}, D_{IV}; L, LeanMachine; P, PigNic; Obs., number of observations; Eating, number of eating processes; Interest, number of events during which a piglet showed interest in eating without doing it; Avg, arithmetic mean; ±, standard deviation

available, which within each category represented the sum of 15 individual observations in 4 min intervals.

Each piglet was weighed individually on the day of stalling in and stalling out. The feed dispensed per rearing period was measured pen-wise. A data set was generated, which included only one observation per pen and per rearing period (n = 16).

Stall climate measurements were carried out only to document the trial conditions.

Results and Discussion

Animal behaviour

As shown in *Table 1*, the number of eating processes observed at the LeanMachine tube feeders during the first two rearing periods significantly exceeded the number of eating processes recorded at feeders of the PigNic type. During the following rearing periods, this difference could no longer be determined. In all pens equipped with LeanMachine feeders, more animals showed interest in eating without actually doing it.

Statistical analysis showed a significant influence of the feeding system on the categories eating processes and interest in eating without doing it. However, the kind of feeder did not exert a measurable influence on the aggressive behaviour of piglets.

The differences between the feeders varied between the rearing periods. While slightly more sucking was observed in groups eating at the PigNic type feeder than in the other groups during D_{II} and D_{III}, the ratio was inverse during the other rearing periods.

Biological Performance

During D_I and D_{IV}, both feeders compared enabled a virtually identical daily weight gain . During D_{II} and D_{III}, however, the performance provided by the PigNic feeder was better than that achieved by the feeder variant. On the average the daily weight gain of the piglets reared at the LeanMashine feeder amounted to 399 g and to 440 g at the PigNic feeder.

The productivity data are remarkable in particular with regard to the results of the behavioural observations. Even if more eating processes were regularly observed at the LeanMachine, biological performance there was not better than at the PigNic type feeder.

During all rearing periods, piglets needed to eat less often at PigNic type feeders than at the other system used for comparison in order to achieve one kilogram of body mass increase. This difference was particularly pronounced in the first two rearing periods, where uninterrupted ad libitum feed dispensing was not guaranteed.

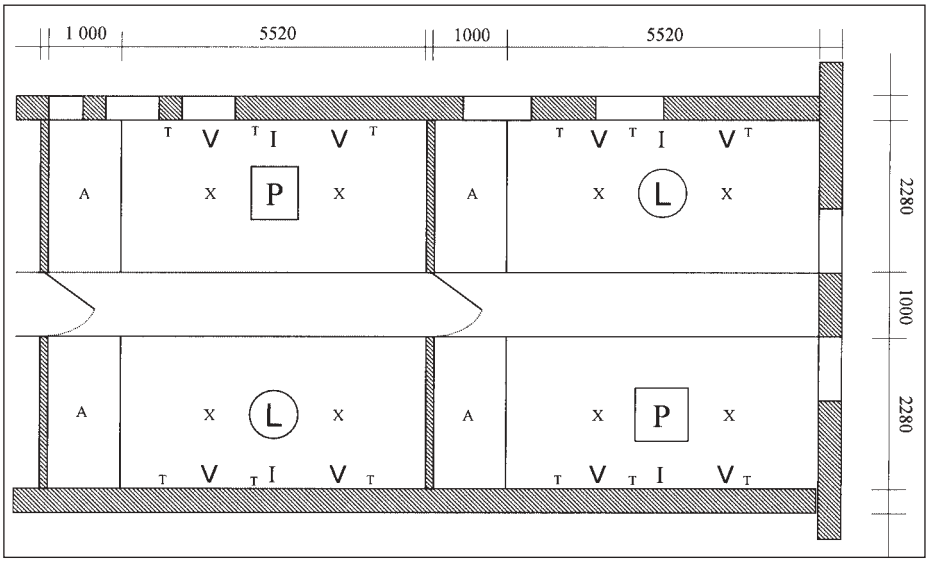

Fig. 1: Ground plans of the experimental sections; measures in mm. A, alternative pen, not used in experiment; I, infrared heater; L, LeanMachine; P, PigNic;T, two „bite" nipple drinkers, arranged above; V, video camera; X, measuring point for discontinuous climate recording.

These findings are in accord with the evaluation of the observers according to which animal behaviour at the newly developed feeder was calmer than at the conventional variant.

At first glance, this initial impression seems to contradict assessments in the literature which state that the round trough may support natural feed intake behaviour better than an angular trough shape [3]. Further research with individually marked animals is necessary to study this point more closely. It must be examined whether trough shape really exerted an influence and which effects were caused by other design features.

On an average 1.94 kg feed was eaten by the piglets at the LeanMachine feeders and 1.83 kg at the PigNic feeders in order to achieve one kilogram of body mass increase.

Conclusions

Two types of tube feeders were compared over four rearing periods. The proven feeder type LeanMachine featured a round trough. The feed was metered out through the movement of opposing, horizontally arranged bars above the trough. Feed consistency was mashy and even led to water building up in the trough. The newly developed PigNic feeder type on the other hand featured a rectangular, three-bowl trough with a centrally arranged metering ring. The feed was moistened only slightly.

At the LeanMachine feeder, more eating processes were regularly observed than in the other pens. However, this difference was not reflected by productivity. Piglets at the LeanMachine needed to eat more often in order to achieve a body mass increase of 1 kg. However, the kind of feeder did not exert any significant influence on aggressive piglet behaviour or intersucking.

The summarised results of the present study show that the newly developed tube feeder of the PigNic type led to calmer eating behaviour. This observation must be validated in a follow-up study, which should possibly be carried out in a second stall facility and, above all, needs to provide a deeper understanding. In order to enlarge the basis of scientifically founded development work, it must be clarified which design aspect is mainly responsible for the differences observed.

Acknowledgements

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Interest

Literature

Books are identified by •

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