

How welfare-oriented are mash tube feeders in weaner rearing?

Mash tube feeders in weaner rearing are gaining in importance but questions remain open as to how far pig welfare requirements are met with such automatic feeders regarding pig: feeding place ratio. The results of an investigation with two group sizes (40 and 60 animals) with different pig-feeding place ratios (6.7:1 and 10:1) show that the frequency of aggression at the feeder with both group sizes does not differ significantly although the time during which the feeder is overcrowded is significantly greater with the 60-head groups.

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Keywords

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Literature

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Until a few years ago weaner feeding featured only a few systems with the piglets usually receiving dry feed ad lib. at space feeders. In recent years there has been rapid development in new feeding techniques featuring, above all, mash automatics and mash tube feeders using a range of pig:feeding place ratios. The effect of such ratios on pig welfare could not be ascertained with the current level of knowledge.

The aim of this investigation was thus to study behaviour and performance of weaner piglets feeding under two pig:feeding place ratios at mash tube feeders using the facilities of the Swiss testing and certification system for serially-produced livestock housing equipment [1, 2].

Method

The investigation was carried out in a FAT pig house in Tänikon (Switzerland).

In two open-fronted deep-straw pens with lying boxes groups of 40 and 60 pigs were compared. Each group had a mash tube automatic feeder with six feeding places for ad lib. feeding. In the 40 groups the pig:feeding place ratio was 6.7:1, in the 60 groups 10:1. There were seven replications for each group size. At weaning in each case, the five lightest and the five heaviest animals per group were determined. These focus pigs were selected to identify possible differences in the various recording parameters regarding „weight classes“.

After a four-day settling-down period (time point „weaning“) and one to two days before clearing the pens (time point „rehousing“) 24-hour video observations were carried out at the feeder areas. In a five-minute

time sampling system the number of animals at the feeders („Feeding“) was determined. The following behavioural traits were continuously recorded:

- **Overcrowding of feeder**
Pigs at feeder outnumber feeding places.
- **Crowding at feeder**
A feeding pig is pushed out by a newcomer to the trough
- **Unsuccessful feeding attempt**
Feeding intention (attention clearly directed at feeder) with no successful result because the feeder is occupied by feeding pigs and pigs approaching have no possibility of reaching a feeding place.
- **Aggression**
Clearly recognisable aggressive behaviour against other pen occupants with snapping, biting and fighting.
- **Time of each feeder visit**
If an animal with the intention of feeding enters a defined area in the vicinity of the feeder this pig is observed until it has left this area. Recorded here is the time the pig spends at the feeder („Feeding“). „Feeding“ was defined as where the pig had its head in the trough. After the pig had left the area the animal taking its place would then be observed.

The behavioural traits during feeder overcrowding could not be recorded by evaluating the video films. Because of this, the frequency of their behavioural traits per hour was calculated based on the length of overcrowding periods at the feeder.

The behavioural parameters were tested for significant differences between both group sizes using the Mann-Whitney U-test. The significance threshold for all recorded parameters was established at $p < 0.05$. For

Table 1: Duration of crowding at the feeder [min.], as well as frequency of displacements and unsuccessful feeding attempts at the tube feeder in groups of 40 and 60 weaned piglets (mean values per hour \bar{x} , standard deviation SD).

Activity period Group size	Day					Night				
	40		60		p	40		60		p
	(\bar{x})	(SD)	(\bar{x})	(SD)		(\bar{x})	(SD)	(\bar{x})	(SD)	
Overcrowding	1.8	3.2	16.5	10.2	<0.01	0.0	0.0	3.3	2.0	<0.05
Crowding	18.6	15.5	34.2	16.9	n.s.	5.3	3.3	15.9	17.6	n.s.
Unsuccessful feeding attempt	5.5	4.2	10.6	4.1	n.s.	1.1	0.6	4.0	3.6	n.s.

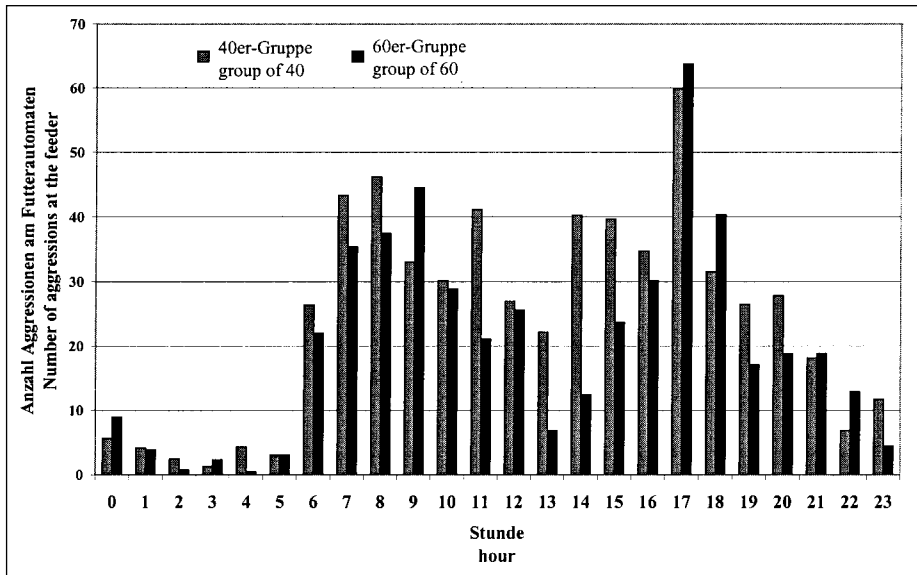


Fig. 1: Frequency of aggressive behaviour of weaned piglets (mean values per hour) at the tube feeder. Data of groups of 40 and 60 weaned piglets were compared.

evaluation of the behavioural data, two activity periods were selected. Using a cluster analysis the period of time of main activity („Day“) and a period of time with reduced activity („Night“) were determined using the behavioural parameter „Number of animals at feeder trough“. The period of main activity lay between 10 am and 6 pm. Between 9 pm and 1 am lay the reduced activity period. Because of the poor picture quality on some video films in the night, only five cycles of the 40 groups could be studied for the parameter „Number of animals at feeder trough“ and only 6 cycles of the 60 groups. For the parameters „Aggression at feeder“, „Crowding at feeder“ and „Unsuccessful feeding attempt“ five cycles were recorded for both the 40 groups and 60 groups. As a result only the outcome from the second recording („Rehousing“) is presented.

Pig behaviour

Ad lib feeding from the mash tube automatic featured a two-phase feeding procedure

daily for the weaners in both sizes of groups. The difference between the two groups regarding number of animals at the feeder was not significant. Neither in the 40 or 60 groups must the weaners utilise night time to make good any lack of feed. With the 60 groups through the „Day“ and „Night“ periods the length of overcrowding periods at the feeder was many times greater than with the 40 groups (table 1). For the 40 groups there was only a very limited amount of overcrowding observed during the „Day“.

The frequency of crowding at the feeders and the frequency of unsuccessful feeding attempts showed no significant differences between the two group sizes either by „Night“ or by „Day“ (table 1). There was, however, a tendency for more frequent crowding and more unsuccessful feeding attempts in the 60 groups.

Figure 1 shows the daily aggression trends at the feeders. Neither by day nor by night was the difference between the group sizes significant. Identified, however, was a tendency towards less aggression in the larger

Group size	40 groups (\bar{x})	(SD)	60 groups (\bar{x})	(SD)	p
Total group	415	31,9	384	54,5	n.s.
Heavy animals	509	75,3	455	104,5	n.s.
Medium animals	405	28,7	384	52,2	n.s.
Light animals	387	44,6	330	55,6	n.s.

Table 2: Effect of group size on average daily weight gain [g] of weaned pigs. Performances of the whole group as well as of light, medium weight and heavy animals were calculated.

groups, a trend conformed in another investigation [3] and explained through the availability of more space in the larger groups offering additional flight opportunities and that the stresses through an aggressive strategy rise when the number of competitors increase.

Regarding the differences in average period of time at the feeder per visit the two group sizes did not differ significantly during „Day“ or „Night“. On average the pigs in the 40 groups stayed 0.9 minutes at the feeder during the „Day“ and the 60 groups 1 minute. During the „Night“ the average period at the feeders per visit lay at 1.1 minutes for the 40 groups and 0.9 minutes for members of the 60 groups.

Daily weight gain

The daily liveweight gain (dlwg) did not differ significantly between both group sizes (table 2) neither in the total group nor by the heavy, average or light pigs. With both pig:feeding place ratios the heavy weaners, however, had the highest dlwg, and the lightest the lowest. For the total group as well as with the individual weight classes there was a tendency for a lower dlwg in the 60 groups.

Conclusions

The behavioural and performance results indicate that a pig:feeding place ratio of 10:1, as in the 60 groups, should be classified as critical. Encouraged, therefore, should be fewer pigs per feeding place.

Literature

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