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Three new feeding systems for group housing of pregnant sows on large scale farms
H.W. van der Mheen and I. Enting, Applied Research, Animal Sciences Groups, Wageningen UR, P.O. Box 2176, 8203 AD Lelystad, the Netherlands.*
Corresponding address: Henk.vandermheen@wur.nl

Abstract
EU regulations state that to improve animal welfare, all pregnant sows have to be housed in groups as from 2013. Farmers are faced with the complicated task of selecting the ideal housing system for their situation. ESF and feeding stalls are well known feeding systems for sows but also new systems appear on the market. These new systems are less well known. We studied three new feeding systems for group housing of sows; an automatic nipple feeder, a long trough and a feeder that uses time intervals between feed portions to distribute feed between the animals.
Service groups of 42 sows were allocated to one of these feeding systems and were followed during five consecutive cycles. Feeding behaviour, agonistic behaviour, growth, reproduction performance, as well as technical aspects and labour requirements of the systems were recorded.
The three feeding systems differed in many aspects. Variation in individual feed intake was the major concern when using the feeder with intervals. Reproduction results were however not impaired by low feed intake. Group division was the main issue with the trough, while agonistic behaviour related to the nipple feeder.
Reproduction results did not differ between the various feeding systems, and we concluded that farmers own management preferences should determine the choice for a certain feeding system.

Presentation
As from 2013 group housing of pregnant sows will be compulsory within the EU. In the Netherlands it will be compulsory for all farmers as from January 1st 2008. Besides all farmers who make major changes to their buildings are obliged to house their sows in groups.
The choice of the feeding system is one of the most important choices a farmer has to make. The feeding systems determines to a extend the pen lay out, the group system, and the minimum size of the service groups.
In the past individual housing systems have been compared with group housing. The conclusion of this study was that results of group housing were as good as individual housing. Regarding the investment cost, group housing compared favourably to individual housing.
Upon request of the Dutch farmers organisation we tested three new feeding systems. These systems are already on the market and several farmers use them in practice. Experience with these systems has however not yet been reported, which makes it difficult for farmers to decide what feeding systems to chose.
We tested the Variomix system, the Fitmix feeder and a long feeding trough for liquid feed. The study was not a scientific study with a direct comparison between the feeding systems, but used a practical approach. Aspects relevant for a feeding system were studied in more detail for that particular system.
We tested the feeding systems with stable sow groups of 42 animals each and followed each group during 5 cycles. The study was conducted at our research farm at Sterksel, the Netherlands.

Variomix feeder
The Variomix feeder is a simple feeder suitable for both dry as liquid feed. 7 to 8 sows per feeder, no detection of the sows. The feed is distributed in small portions of 20 grams each with a certain interval between portions. The duration of the interval determines the feeding level.
This systems functions technically well. We had hardly any breakdowns. The sows learn quickly the use of the feeder. The farmer has a good control over the feed intake at pen level. Feed intake follows fairly accurate the feeding level.

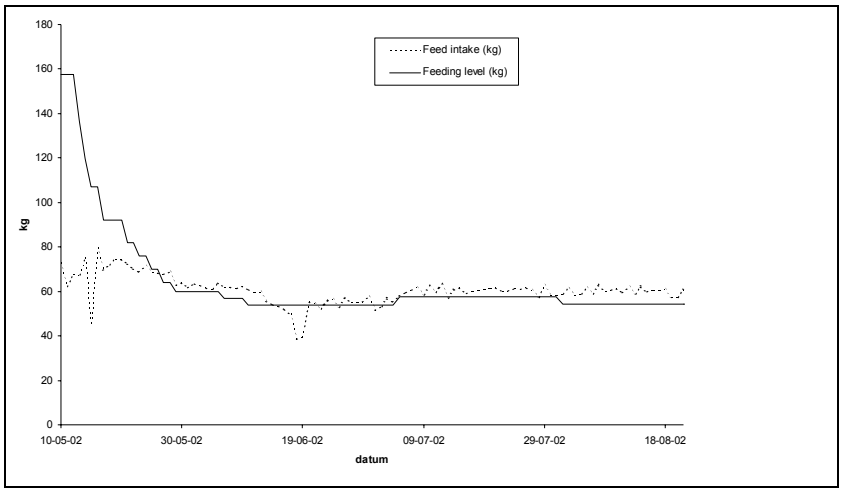

Figure 1: Feeding level and actual feed intake at pen level.

However a farmer has no influence on the feed distribution between sows within a pen. Variation of individual feed intake is high. We tested various measures to minimize this variation but without much success. We did find an importance difference in sow groups. Younger sows showed much less variation in feed intake than did the elder sows. In the groups with the elder sows, several animals had to be taken out of the group because they did not mange to get enough feed.

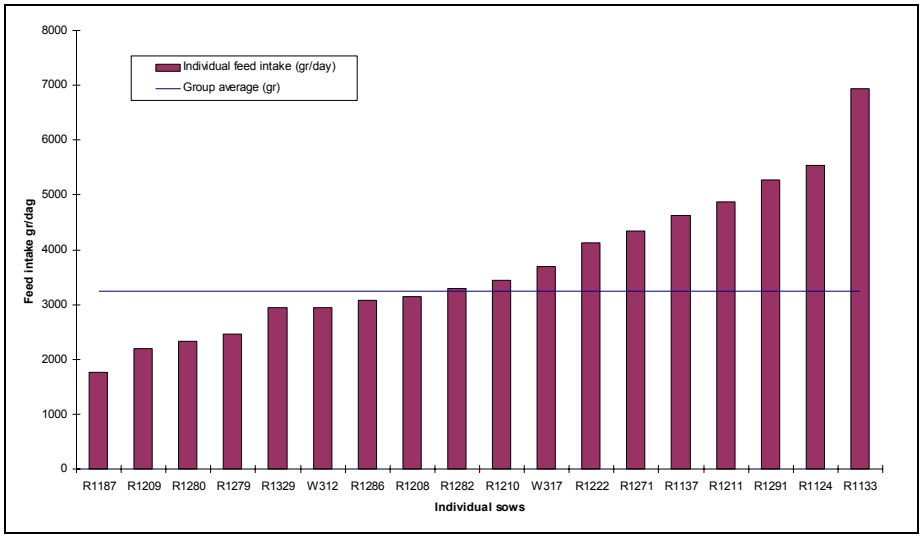

Figure 2: Individual feed intake within one sow group during a cycle

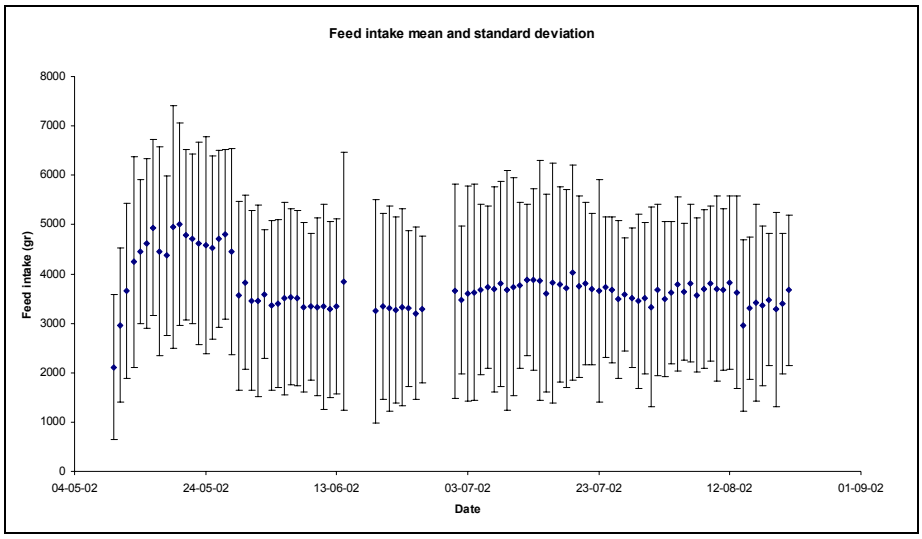

Figure 3: Mean and standard deviation of individual feed intake during a cycle

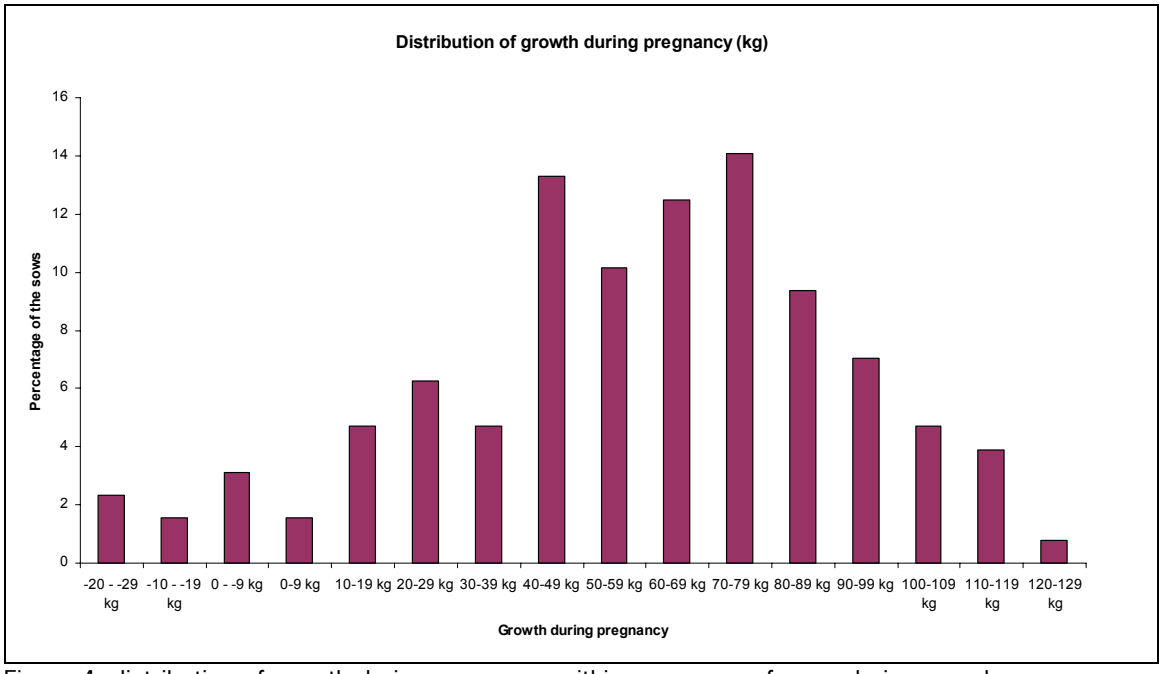

Figure 4: distribution of growth during pregnancy within one group of sows during a cycle

We did not find an influence of the variation in feed intake on the reproduction results of the sows. Reproduction results; 11.6 live born, and 10.0 weaned piglets per sow per litter.
The conclusion was that this feeding system is appropriate for farmers who want a simple an easy feeding system, but that is was not suitable for farmers who want to keep good control over the feed intake of their pregnant sows.

Fit mix feeder

The Fit mix feeder is an individual feeder with registration of the sows. It handles dry feed only and is suitable for groups of 15-25 sows. It requires little space, and has few moving mechanical parts. The sows do not eat from a trough but instead feed is delivered pipe with an Archimedes screw. Water is added to make the feeding easier.
At the transition of individual housing to group housing with a Fit mix, it took 2 weeks of extra attention before all the sows learned the use of the Fit mix. After that period, young sows learned the use within 2 days, with minimal attention.

Individual feed intake is good, uneaten feed is around 1% on average during a whole cycle.

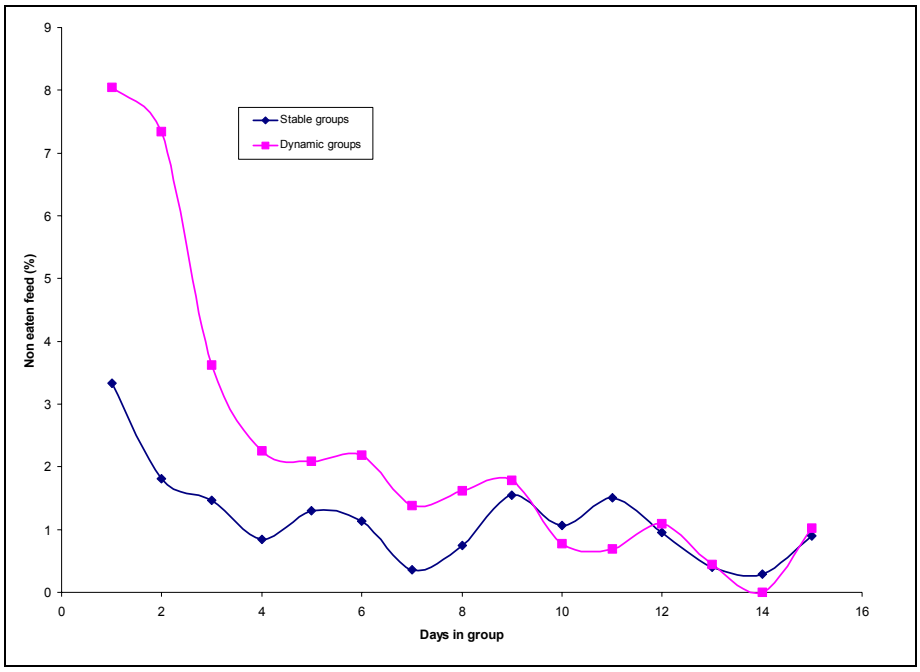

Figure 5: Uneaten feed during first days in a group for a stable and a dynamic group system

Since the animals are not separated from the group while eating there are quite some disturbances during the eating process. Feeding efficiency is therefore reduced in dynamic groups compared to small stable groups. The preferred start of the feeding cycle is around 15:00 hours. Total activity was not different compared to the start at 01:00 hours, but there was less activity in the group during the morning hours. Besides it allows for control during the start of the feeding cycle.

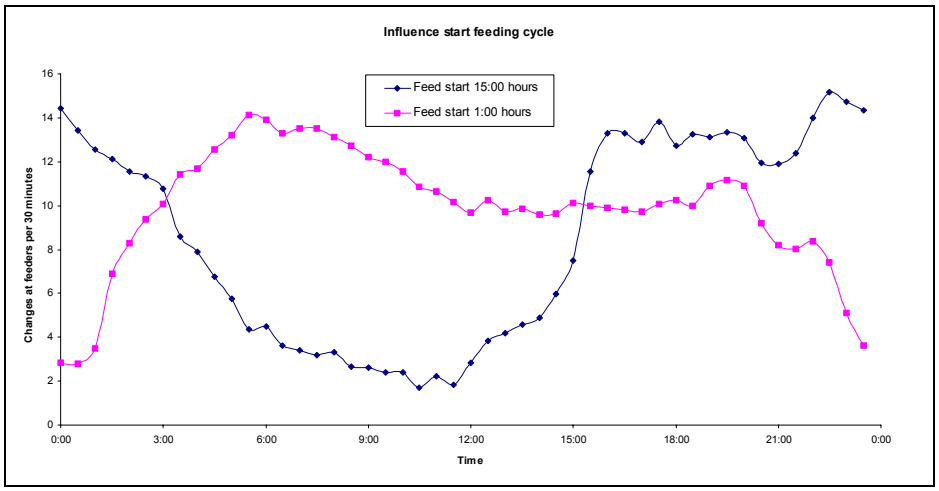

Figure 6: Number of changes between sows at the feeder per half at start of feeding cycle at 15:00 and 01:00 hours.

Reproduction results; 11.6 live born, and 10.6 weaned piglets per sow per litter.
The conclusion was that the feeder functions well, it requires some computer skills from the farmer, and some aggressive interactions between sows exist during feeding. However in stable groups this aggression is limited.

Feeding trough

For stable groups only. 6- 40 sows per group. Fixed pen lay out, since feeding space at the trough determines the length of the solid floor and the slatted floor. Simultaneous feeding improves the control of the animals. Turmoil at the start of the feeding should be minimized by fast feed distribution over the whole length of the trough. Possibly in two distributions. Feeding once a day limits the variation in feed intake of the sows. Partitions at the trough resulted in less changes of position of the sows, but had a negative effect that it took much longer for the sows to find a place to eat. Growth during pregnancy was higher than with the other feeding systems.

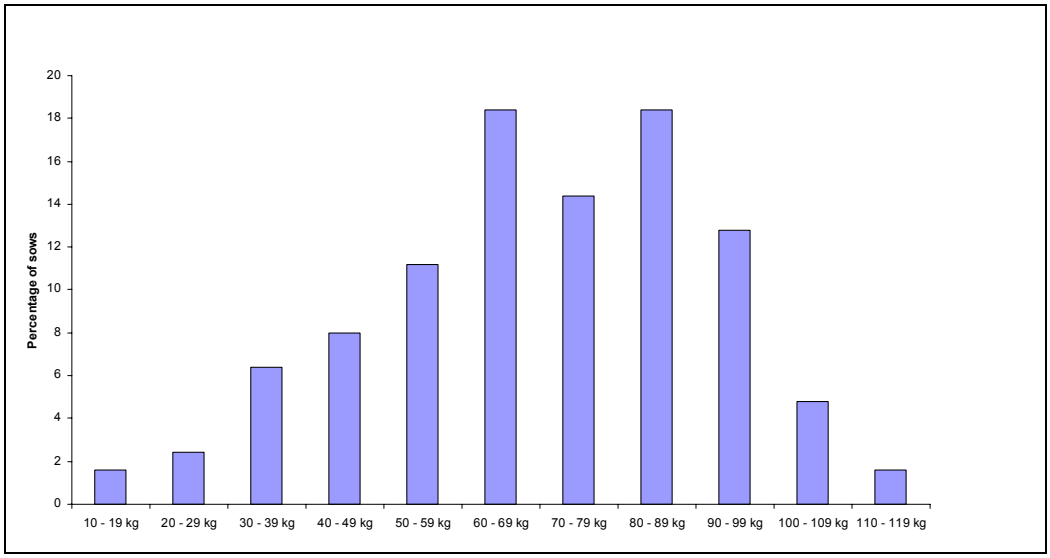

Figure 7: Distribution of growth during pregnancy of sows fed at trough

Reproduction results; live born 11.5, and 10.4 weaned piglets per sow per litter.
The conclusion was that the system requires fast feed distribution, service groups of at least 24 animals and that the dirtiness of the pens is a matter of concern.