

Steffen Hoy, Gießen, and Helmut Niklaus, Dummerstorf

# Feeding pregnant sows with wet-feed tube automatics

*Ad lib feeding, and a further-developed rationed feeding of pregnant sows with a wet-feed tube automatic, introduce new systems with simple technical solutions and lower investment requirements which are suitable for fitting in a very variable manner into different types of housing. To avoid blockages and bridging where rations have a high straw meal content, a special tube automatic can be used. The decision for ad libitum or for restrictive feeding is dependent on the size of groups, cost of feed, the availability of home-grown feed, milling and mixing possibilities and other factors – given equal biological lifetime performance of the sows.*

Whilst according to the German pig production welfare statute, sows should have at least four weeks of daily freedom of movement after farrowing, sows in Denmark have to be kept in groups from four weeks after farrowing. In the Netherlands, sows must go into loose housing from the fourth day after insemination until seven days before farrowing. These sort of developments indicate that there will be increasing demand for loose housing of sow groups in Germany too.

Feeding of sows in group housing is possible individually and computer controlled (transponder-controlled automatic, liquid feeding nipple), restrictive (self-catching feeding crate, dribble feeding, liquid feeding) or ad lib (dry automatic feeder, liquid automatic feeder).

The individual or rationed feeding system involves techniques that are more complicated and relatively expensive. The investments for the feeding technology with transponder-activated feeding, liquid feeding via nipple and self-catch feeding crate are around 300 to 560 DM per sow place. Liquid feed automatics for ad lib feeding have been introduced lately, particularly in some large units in eastern Germany [1, 2]. Here, however, the energy concentration of the feed has to be reduced to 8 to 9 MJ ME/kg in order to avoid the sows getting too fat with subsequent effect on breeding condition. To reduce feed intake and also cut the costs of feeding here, the drinking points were turned-off in the liquid feed automatics or else a

change was made to dry feed automatics. The keeping of six to eight sows per single feeding space was against the Pig Production Statute which requires an animal:feeding space ratio of 4:1 for ad lib feeding.

This problem can be solved through the use of wet-feed tube automatics which presently offer four feeding places so that 16 sows per automatic (with dry feeding) and 24 to 32 sows can be fed where the equipment is used as wet-feed automatics with the liquid deposited in a trough. Wet-feed tube automatics can, in principle, be used for ad lib feeding or, with just a few technical adjustments, for restrictive feeding.

## Wet-feed tube automatics for ad lib systems

Ad lib feeding can be carried out with special compound feed according to a “Welfare” concept [3], or home-produced feed mix can be used. Because of the, in part, very high costs of the industrially-produced compound feed (up to 350 DM/t), and the average higher daily feed intake of from 0.5 to 1 kg extra, ad lib feeding leads, in comparison to restrictive feeding, to feed costs which are higher by from around 25 to 100 DM per sow and year. If the farmer used home-grown feed the cost of the rations can be reduced. As a feed rich in crude fibre (advised maximum crude fibre content in the ration of around 12.5%) sugar beet pulp, dried green-crop and straw meal can be utilised. Dried beet pulp with its high water absorption gives a faster-acting and longer-lasting “full” feeling and, at a proportion of 32.5% (in extreme cases up to 55%) has a feed-intake reduction effect in the ration. For the use of this high water absorption crude fibre component in the feed mix, a standard manufactured sow automatic feeder (fig. 1) can be used. The filling of the automatic is possible by hand or feed chain pipeline. In in-house investigations, this automatic has been used in pens with 16 sows (animal: fee-

Prof. Dr. Steffen Hoy is director of the special department Livestock Husbandry and Husbandry Biology at the Institute for Animal Breeding and Livestock Genetics of the Justus-Liebig-University Gießen, Bismarckstraße 16, 35390 Gießen; e-mail steffen.hoy@agr.uni-giessen.de.

Dr Helmut Niklaus directs the Special Advisory Service for Pig Production, Dummerstorf, Alte Reihe 26- Laborgebäude, 18196 Pankelow; e-mail: Dummerstorfer-Spezialberatung@t-online.de.

## Keywords

Sow, group housing, tube wet feeder

Fig. 1: Tube wet feeder for ad lib feeding of pregnant sows with high fibre straw meal diet



ding space ratio 4:1) since December 1999. The data up until now indicates very large differences in daily feed use between the groups (2.4 up to nearly 5 kg feed per animal and day). The feed loss through scattering of feed is still too high and must be reduced through the following methods:

- Shutting-off drinkers in the trough and installing water outlets on the pen walls
- Establishing solid flooring under the trough area so that scattered feed is still available for eating
- Storage of a daily feed amount which is only a little over the actual daily consumption.

The wet-feed tube automatics available on the market and tested by us are not suitable when straw meal is used instead of dried beet pulp as crude fibre component in the feed. With a straw meal proportion of 25 to 35% in the ration, there occurred bridging and/or blockages in the dosing mechanism. Thus, a special tube automatic feeder was developed for rations with high proportions of straw meal (utility model protection under trade mark law). The automatic feeder consists of a tube about 1500 mm in height with a diameter of 300 mm (fig. 2). The tube stands on a feeding table 340 mm wide and 20 mm high whereby the gap between the bottom of the tube and the feeding table surface is variable from 20 to 35 mm. The round trough has a diameter of 700 mm with a outer lip height of 100 mm. In the tube interior is fitted an emptying facility which can be activated by the sows at four points. This avoids feed bridging in parts of the feed storage tube not accessible to the sows. Additionally, a chain is also attached in a way which prevents bridging. Tube and trough are attached to two posts by lateral struts. The tube has a capacity of 70 l (around 28 kg of feed with a straw meal content of 30%). The tube automatic feeder has no drinkers – the sows getting their water away from the feeding trough.

The automatic was fitted into a group pen for eight sows and can be used for ad lib feed-

ing or restricted feeding systems (animal: feeding space ratio of 4 and 2:1). The basic practicability of the wet-feed tube automatic, or the tube automatics for the ad lib feeding of pregnant sows, was proven. In addition to the technical problems associated with the use of straw meal (labour input, dust creation, feed component separation during feed chain transport and storage, mycotoxin concentration) and the higher feed costs, one also has to pay attention in the ad lib feeding of pregnant sows that the systems permits no influencing of the biological lifetime performance of the sow when measured over several pregnancies and nursing periods. In this aspect, no reliable information is available. At the same time, a luxury consumption of feed, and the associated increased nitrogen emissions, must be avoided on environmental-hygiene grounds.

### Wet-feed tube automatics for restrictive feeding

Because of the expected disadvantages of ad lib feeding for pregnant sows, wet-feed tube automatics were redesigned for restrictive feeding with an animal: feeding place ratio of 1:1 and were fitted with a new-type volume dosing mechanism (patent pending). Two commercially-available wet-feed tube automatics were fitted with feeding place partitions so that, per automatic, four feeding places, each with a breadth of around 550 mm, were created (fig. 3). With the restrictive feeding, the sows got a specific amount of carrier-feed (around 2.5 kg per sow and day) in one or two feedings. No special energy-reduced feed was necessary. When a sow activated the feed emptying mechanism, or the moved the perpendicular tube, feed in an approximately similar amount fell in the other three trough compartments, too. As long as there was still feed in the tube, the sows were fixed to their feeding place, as it were (analogous to dribble feeding). Behavioural investigations showed that, immediately af-



Fig. 3: Tube wet feeder for rationed feeding of pregnant sows

ter the beginning of feeding, the sows took a place at the automatic and that only a little pushing and shoving of feeding animals took place. The average feeding time required for the consumption of an 1.25 kg meal-form feed was 25 minutes. With eight sows per group the pen structure allows good observation. With the wet-feed tube automatics available on the market up until now, the sow groups must be of a number that can be divided by four, except where an automatic can be built into the pen wall (Requirement: both adjacent pens are filled). Investigations up until now, with 36 gilts and sows up to the second litter in this group system compared with a control of 86 sows in tether stalls, shows that a similar performance was achieved in the group production system, with an average 9.4 piglets born alive, as with the control animals (9.3 piglets born alive).



Fig. 2: Tube wet feeder for rationed feeding of pregnant sows

### Literature

- [1] Hörügel, K. und L. Hagemann: Ad libitum und doch nicht zu viel. Neuartiges Verfahren für tragende Sauen. *dlz agrarmagazin* 46 (1995), H. 9, S. 101 – 104
- [2] Küchenhoff, R., E. Meyer und K. Hörügel: Fütterungsverfahren in der Gruppenhaltung tragender Sauen. Proc. 4. Internat. Tagung Bau, Technik und Umwelt in der landwirtschaftlichen Nutztierhaltung. 9./10. März 1999, S. 291 – 296
- [3] Van der Vinne, H.: Tragende Sauen „satt“ füttern. Neue Fütterungsstrategie im Wartestall. *dlz agrarmagazin* 50 (1999), H. 3, S. 154 – 156