Group Housing: Alternative Systems, Alternative Management

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■ Introduction

In 1993, Leo den Hartog reviewed what was then known about modern group housing systems for sows (den Hartog, et al., 1993). In his summary he stated that group housing systems were relatively new and that they were likely to improve rapidly with appropriate research and development. Although the basic systems he described remain the most common alternatives to stall housing, we now recognize that there are different management options as well within each system. Producers considering group housing must recognize that there is no single representative group system, and few statements can be made about such systems that apply to all group housing. Producers must decide what they want to achieve in group housing and select the system and management program that will most likely achieve those goals.

Most classifications of group systems are based on how the animals are fed. No doubt this preoccupation with feeding is related to one of the primary reasons for our initial change to stalls, that is, control over individual feed intake. I will continue to classify group housing systems by feeding type, but I will also examine management options for social behaviour, sow comfort, and reproduction.

■ Group Housing Systems: Feed Control

Control of feed intake can be viewed at three levels. The first is achieving an appropriate average feed intake in the sows, although there is no control over individual intake. The second level of control achieves equal intake for all individuals, but does not allow differential feeding. The final level of control is the ability to feed different amounts to each animal. A well-designed and

managed stall system can achieve this highest level of control. In reality, most operations using stalls do not achieve this level of control but only approximate it. Often sows are fed identical amounts until a problem in animal condition is noted and adjustments are made. It is also possible for sows fed in a trough within their stalls to steal significant amounts of feed from a timid neighbour. Inter-stall aggression is common in stall systems (Mendl, et al., 1993) and is generally related to feed access.

The simplest group housing system involves floor or ground feeding and can only effectively achieve the first level of feed control, an appropriate average intake. Floor or ground feeding can be mechanized by the use of feed drops. The new directives within the European Union on sow housing not only limit the use of individual penning, but also indicate that sows must be fed in such a way that feeding-related aggression is not excessive. Floor or ground feeding systems are competitive in nature and may not meet such a requirement for low aggression. Thus, floor and ground feeding systems have two significant limitations in regards to feeding; uncontrolled variation in individual feed intake and the potential for excessive feed-associated aggression.

It is possible to reduce, but not eliminate, the problems associated with floor feeding. Providing more space will reduce the aggression associated with feeding. Although feeding the animals in a strawed area has been suggested as a means of occupying the animals and reducing aggression, the opposite occurs with more feeding-related aggression (Whittaker, et al., 1999). The inter-individual variation in feed intake can be reduced by making it difficult for a sow to defend the feed, by forming groups of similar sized sows and by spreading the feed evenly over a large area. Providing more feed for thinner sows can best be achieved by sorting them into another group and increasing the amount given per sow. In general, we have exerted social control by forming small, evenly sized groups. The alternative, of forming large groups of variable sized animals, may also be a viable option (see below on group size).

A relatively even distribution of feed can be achieved with the trickle system. In this system a short feeding stall, protecting the head and shoulders of the animal, is provided for each sow in the pen. All sows are fed simultaneously by a slow release of feed down drop tubes into each stall. All sows within a pen are fed the same amount as it is not possible to pre-determine which animal will enter each stall. To prevent animals from stealing feed from another sow, the feed is ‘trickled’ in at a rate at which the slowest animal can consume. Thus, no feed will accumulate for another sow to steal. To achieve differential intake by different animals, they must be sorted into groups with uniform feed requirements. To reduce the potential for animals to attempt to steal feed, sows are often sorted by eating speed, with the slower eating gilts in their own group.

True individual control of feed intake is only possible if sows are individually confined during feeding. The simplest method to achieve this is to use feeding stalls. Sows are allowed into the stalls, usually being locked in for protection, during feeding. Because feeding stalls are only used for feeding, the animals do not need to lie down in them and the stalls can be narrower than gestation stalls. Typically all animals are fed the same amount, but individuals can receive additional feed by hand. Several groups can use one set of feeding stalls sequentially. The system can be automated with electronically controlled gates to allow different groups access to the feeding stalls at different times of the day (Morris and Hurnik, 1990). Feeding stalls can also be used for estrus detection and breeding for those who prefer this means of reproductive management.

An alternative to individual feeding stalls for achieving individual control of feed intake is the electronic sow feeder. In this system, sows in a group have access to one or more feeding stations, which consist of a stall and feeding equipment. The animals typically wear an electronic identification transponder in an ear tag that allows the sensors in the station to identify them. Once identified, the animal's records are checked and any portion of its daily ration is released to the sow over a period of several minutes. Each animal can be programmed for a different amount of feed, and most sows consume their entire ration on one visit (Eddison and Roberts, 1995). The system resets on a daily basis to allow animals access to another day's ration. In both the individual feed stall and electronic sow feeder systems, different sized animals requiring different amounts of feed may be housed together, with control over feeding achieved within the feeding stall.

One of the most commonly stated advantages of gestation stalls is the control exerted over individual feed intake. Similar levels of control are possible in some group housing systems with little social management of group composition. In other systems, sorting of sows by size or feed requirements is necessary to obtain even a moderate degree of control over feed intake.

■ Social Management

Aggression among sows, particularly at the time of grouping, is considered a negative aspect of group housing. Social management should attempt to reduce re-grouping aggression, the social tensions within a group on an ongoing basis, and, as noted above, may be used to achieve some degree of control over feed intake in the floor and trickle feeding systems. Social management includes a number of techniques, but the major considerations are the frequency of re-grouping, sorting, and group size.

Some degree of re-grouping will occur in all group systems. A typical breeding group (all females bred during one week) will include sows that have been weaned and bred on their first estrus, late or repeat breeders, and replacement gilts. These three sub-groups are usually unfamiliar to each other but may find they are grouped together for gestation. If animals are grouped together once, and no additional animals are added to the group for the remained of the gestations, we call this a static group. The majority of the overt aggression occurs on the first day together. A static system seeks to minimize re-grouping aggression. The question is, 'How deleterious is re-grouping aggression to the welfare and productivity of sows?'

The alternative to static groups is dynamic grouping. Dynamic groups are typically used to increase the number of animals in a group either because the animals are sorted or too few animals are bred in one week to achieve the desired group size. A single electronic sow feeder station can accommodate over 50 sows, but this is more than many farms breed in one week. Managing the animals in dynamic social groups allows the producer to achieve groups of 50 animals on each station. New animals are added to dynamic groups on several occasions during an animal's gestation. Thus, each animal must not only enter an unfamiliar group, but will later encounter more unfamiliar animals as they are added to the established group. This system involves frequent re-grouping, and if re-grouping aggression is deleterious, the animals' welfare and productivity are likely to suffer.

Sorting is probably necessary to operate floor and trickle feeding systems successfully. However, individual feed intake control is possible in feeding stall and ESF systems without sorting animals by parity or size. But is there an advantage to keeping gilts separate or sorting sows by size? Remember that breeding sows may differ in size by a factor of two or more, a degree of variation uncommon in any other phase of pig production. Typically, assessments of injuries to animals in group housing indicate that minor scratches and scarring are more common on younger animals than on older. A common recommendation is to keep gilts in separate groups throughout their first gestation.

The size of groups being used in group housing systems varies greatly. Depending on decisions made on static vs dynamic management and on sorting, producers may have the potential of forming groups of a few up to several hundred animals. A fairly common management approach using the electronic sow feeder system is to operate dynamic groups of mature sows in groups of more than 200 animals. The feeder stations are programmed to sort animals out when they are ready to move to farrowing. On the other hand, floor and trickle feeding systems typically are managed with small social groups, often less than 10 sows. Our experience with grower/finisher pigs indicates that aggression in large groups of animals is no greater on an individual basis on the day of re-grouping than in small groups, and is often minimal on

subsequent days. Large social groups allow animals to avoid and, if necessary, flee from aggressive pigs. Living in a large group results in an animal that is less likely to fight when subsequently encountering unfamiliar pigs. In addition to the above-mentioned use of large dynamic groups in electronic sow feeder systems, large group management may have applications to gilt development and floor feeding systems. As living in large grower/finisher groups reduces the aggressiveness of a pig, perhaps we should make the decision to raise gilts destined for group housing in large groups. In terms of floor feeding systems, feeding aggression is seen as the primary reason to sort animals into small groups. Perhaps larger group sizes would serve as another means of reducing aggression to acceptable levels. Both of these applications are speculative and must be properly assessed before adoption as a standard practice.

■ Comfort Management

One of the purported advantages of group housing is that animals have greater control over their micro-environment and should be able to achieve greater comfort than in a stall. Sows can move to a different area within the pen to avoid a draft, lie in a wallow or huddle under straw. Although any large pen would provide some environmental variation, managers have the opportunity to enhance this diversity and allow the animals greater control. The provision of areas of high and low air movement, a wallow or localized misting area, bedding or foraging substrate, and even variable lighting within a pen will allow animals to control their comfort. Continuously misting a small area eliminates the need for timers and may conserve water, and allows sows to individually choose when they want to be cooled. Providing straw not only allows the animals to achieve thermal comfort during cool conditions, but also is a non-injurious chewing substrate for animals that are typically hungry during much of the day.

■ Reproductive Management

Various options exist for reproductive management in group housing systems. Producers may wish to combine stall and group systems by keeping sows in stalls from weaning until they are confirmed pregnant before placing them in groups. However, breeding and pregnancy checking can be accommodated in group systems as well. Fairly rapid estrus detection can be achieved by bringing a boar to a pen adjacent to the group for a short period each day. Alternatively, sows may be run by a boar on the way to or when returning from a feeding floor or feeding stalls (Morris and Hurnik, 1990). If several animals require breeding, they can be penned in stalls for a short time. In feeding stall systems, the boar can be used for estrus checking and breeding can be

performed while the animals are still in the stalls. Pregnancy checking can be performed in feeding stalls, but producers have also found it easy to check animals in the group pen. In large groups in electronic sow feeder systems, the station can be programmed to identify and mark animals to be checked.

■ Our Experience

We have managed sows in three systems concurrently on the same 600 sow farm. These were conventional stalls, ESF with static weekly breeding groups, and ESF with dynamic groups sorted by size. Both group housing systems were housed in partially slatted pens and included gilts in the social groups. The animals were housed in stalls for 10 days after weaning for breeding and then moved to group housing. The summary presented below represents the results of the 3rd and 4th reproductive cycles after the farm was stocked. The adjusted values represent a herd standardized to 25% gilts, 25% young and 50% old sows, which was the approximate distribution of the herd. The values represent the production of live piglets per 100 sows mated (farrowing rate x live litter size).

Table 1. Number of piglets produced per 100 sows mated in three management systems.

	Sow Class			
System	**Gilt**	**Young**	**Old**	**Herd adjusted**
Static (ESF)	**759**	**687**	**1093**	**908**
Dynamic (Sorted, ESF)	**880**	**801**	**989**	**915**
Stalls	**911**	**785**	**1007**	**927**

These data indicate that despite the inexperience of the farm with group housing, productivity differed by only 2% among the systems. In regards to the question of deleterious effects of re-grouping aggression on sow productivity, the frequently re-grouped dynamic system performed as well as the static. However, the variation among age groups was greater in the unsorted static system than in size-sorted dynamic system. The older sows performed better in the static system than in either the dynamic or stall systems. The relatively poor productivity of the gilts in the static system suggests that changes should be made in gilt management within the system or gilts should be housed separately. These data are not definitive but suggest that social management (sorting, re-grouping) may be critical to the productivity of various age classes in group housing.

Conclusion

It is important to recognize that group housing encompasses a number of variations in feeding systems, social, comfort and reproductive management. Comparisons of 'group' housing to stalls may be limited in the range of variations in group housing included or poorly defined in terms of the feeding and management programs studied. Producers should consider the goals of their move to group housing and select a feeding system and management programs that are most likely to achieve those goals. As in any system, an analysis of production records may provide insight into how the system and management can be improved.

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