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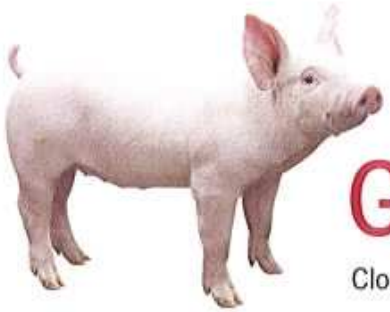

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Closing the Gap Between Genetic Potential and On-Farm Performance

GAP proactive in funding research into sow housing options

Recognizing the potential future effect of changing attitudes to sow housing, GAP Genetics proactively supported a major research project looking at housing options in 2001. So when recent announcements from the two largest pork production companies in the United States and Canada called for the elimination of sow gestation stalls in their systems within ten years, the research results couldn't be more timely.

Smithfield Foods Inc. owns approximately 1.2 million sows in the U.S. while Maple Leaf Foods Inc. has just over 100,000 sows in Canada. With considerable change already underway in the European marketplace, and growing consumer-driven concerns in North America, these announcements echo prevailing public attitudes and come as no real surprise.

Will all producers be facing housing change within ten years? This question is first and foremost on many producers' minds. While this signifies a major change in how producers manage sow herds, a multitude of options are available, all having pros and cons. At least we have some time to reflect on how these proposed changes might impact our industry.

The University of Minnesota, Southern Research and Outreach Center has studied stall and group sow housing for several years. A herd of 800 GAP English Belle females has been housed at this farm since 2001. Half of this herd is housed in conventional sow gestation stalls while the other half is housed in groups with an Electronic Sow Feeder in each group. The following article summarizes some interesting and timely findings.

Group Feeding of Sows: A Review of Available Options

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The Conventional sow gestation stalls on fully slatted floors.

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Introduction

Current intensive pig production has lead to pigs remaining indoors during their entire life. Sows have been kept individually during pregnancy and lactation.

The benefits of keeping sows in individual accommodation includes:
(1) Better control of feed intake;
(2) Elimination of fighting between sows;
(3) Easier management of the individual sows; and
(4) Reduction in labour and better working conditions.

The drawbacks to keeping sows indoors includes:
(1) Higher capital investment;
(2) Behavioural restrictions on the individual animal;
(3) Injury to feet, legs, tail and head; and
(4) Difficult detection of estrus especially in first litter sows.

A concern of society is the welfare of gestation sows raised under intensive housing conditions. This paper evaluates available options for gestation sows.

Aims of Gestation Sow Housing

The requirements of the sow can be expressed in terms of the five freedoms outlined by Webster (1987): Freedom from malnutrition; Thermal or physical discomfort; Injury or disease; Suppression of normal behaviour; and Fear and stress.

The requirements for the swine producer as suggested by Edwards (1990) are: High biological performance; Low labour input; Ease of management; Acceptable capital cost; and Acceptable financial return.

From these two requirements, the aim of gestation housing is summarized as follows:

1. Keep sows protected from the environment
2. Keep sows protected from other sows
3. Feed sows at levels to avoid obesity or starvation
4. Maintain pregnancy and health and ensure well-being
5. Provide a safe and enjoyable workplace
6. Ensure that the system is robust to errors in management
7. Meet these aims within the financial constraint of current income levels

The objective of this review is to briefly describe the current information available on different options of feeding gestation sows.

Group Gestation Sow Housing Systems

Group gestation housing systems differ in terms of:

1. Feeding
   Group or individual
   Simultaneously or sequentially
2. Housing
   Straw
   Slats
   Concrete
3. Group Management
   Stable
   Dynamic

Group Gestation Sow Feeding Options

1. Dump Feeding:

This is a simple, relatively cheap option for feeding dry sows. The system can accommodate large or small dynamic sow groups. Feed is dispensed automatically on the floor and sows are fed simultaneously. It is advisable to provide small pens for bullied or hurt sows.

Positive features of the system:

1. Lower cost
2. Conforms to welfare standards
3. Simple to operate
4. Small or large group of sows accommodated
5. All sows are fed at once
6. Good sow observation

Negative features of the system:

1. No control over sow feed intake levels
2. Higher level of management required to ensure adequate intake of feed
3. High feed wastage
4. Pens required for bullied/thin sows
5. Identification of sows is difficult

2. Voluntary Sow Cubicles:

This is an alternative system of loose housing for dry sows where sows can be kept in small groups of three to five. Individual feeding is accomplished by using manual or automatic feed dispensers.

Positive features of the system:

1. Individual sow feeding
2. Protection of sow at feeding time
3. The system is simple to manage
4. Good observation of sows possible during feeding time

Negative features of the system

1. Manual opening and closing gates
2. There is some aggression between sows
3. The system may not be perceived as welfare friendly

3. Group Housing with Electronic Feeder Stations (ESF):

In this system, sows are housed in a group with one or more electronic feeder stations to feed them individually. The system requires that individual sows be identified to have access to the electronic feeder stations. Different identification systems are available. Collar transponders were the first to be used but were very labour-intensive. Ear tag transponders are currently the most common identification system on the market, but these can also be easily lost. Injectable transponders are currently available.

Positive features of the ESF system:

1. Conforms to welfare standards
2. Accurate individual sow feeding
3. Sick sows or sows off-feed are easily identified
4. Good sow observation
5. Allows for flexibility on sow numbers

Negative features of the ESF system:

1. High level of management required
2. Incidence of fighting and other types of aggression such as vulva biting
3. Difficult to feed sows during system breakdown
4. Sows are not all fed at once
5. Requires a pen for training sows

Housing assessment study

We conducted a study in 2003 at the Southern Research and Outreach Center, University of Minnesota at Waseca to assess the welfare and performances of sows (GAP Genetics, Winnipeg, MB Canada) housed in conventional gestation stalls (7ft x 2ft or 213cm x 61cm) and in group pens with ESF (22ft x 42ft or 670cm x 1280cm). Both systems had fully slatted floors. A single pen with an ESF accommodated 50-60 sows. Each sow in the ESF had an electronic transponder attached to the ear tag in order for the system to identify the sow and deliver the pre-fixed amount of feed for that sow. The pre-fixed amount of feed is determined for each sow at weaning or within 24 hours after breeding.

The electronically controlled gate of the ESF system remained closed for 30 seconds if a sow that had already consumed the daily allotment of feed entered the feeder. After 30 seconds the door automatically opened to admit another sow. However, if a sow that had not consumed her daily allotment of feed entered the feeder, the door would remain closed until the sow finished eating. The research unit followed a bi-weekly weaning system and sows were added two times to a single pen with ESF to occupy it completely. This resulted in getting the sows mixed twice. We assessed the welfare of the sows in terms of injury levels, salivary stress hormone concentration, behaviour and longevity.

In general, the injury scores of sows in pens with ESF were higher at the time of mixing than at other stages of gestation. Most of the aggressions in the ESF system were related to mixing of sows and feeder entry. The system allowed only one sow to eat at a time resulting in sows waiting in front of the feeder for their turn. This competition caused aggression among the sows.

Group sow housing with electronic sow feeders.

The aggressions were proportional to the waiting time. Sows in this system had higher levels of bite injuries on vulva and legs. The stress hormone levels were also correlated with aggressions and waiting time.

The injuries, stress hormone levels and the level of aggression among stall-housed sows were less. But they had relatively higher injury scores and stress hormone levels at late gestation compared to mid gestation. Stall-housed sows and sows in pens with ESF did not differ in production performance in terms of conception rates, litter size, born alive/litter and stillborn/litter. However, more sows were removed from the pens with ESF and the major removal reason was lameness. Although stalls offer protection to sows from other aggressive sows, the space restriction is a major handicap. The space limitation is often sufficient to cause injuries, especially in larger sows at late gestation, as the relative space availability is severely reduced. However, on the other hand, the mixing of unfamiliar sows within group pens with ESF resulted in aggression to establish hierarchy leading to severe injuries. Also, the feeder acted as a source of aggressive interactions. This suggested that though the group pens with ESF ensured freedom of movement, the system required further modifications to make it a welfare-friendly system for gestating sows.

Conclusion

Gestation stalls are designed to provide sows with protection from aggression. However, analysis of results of the study reported here suggested that stalls impose severe restrictions in movement because of limited space toward late gestation, and this restriction is sufficient to cause notable injuries. The possibility of aggression at the time of introduction and mixing and at ESF entry makes pens with an ESF a challenge for gestating sows, as evident from the number of injuries during early and late gestation. The possibility of aggression both at mixing and at the feeder makes the pens with electronic sow feeding (ESF) a stressful type of accommodation for gestating sows. The injury levels and cortisol contents were lower in stall-housed sows compared to sows in pens with ESF, which is one measure suggesting better welfare. The production data indicated a better body condition for sows housed in pens with ESF than sows housed in stalls. However, group-housed sows with ESF were more restless during parturition and early lactation as indicated by the increase in the pre-weaning mortality. Modern group systems are relatively new and are likely to improve rapidly to ensure effective manageability of sows in both gestation and lactation.

For a complete copy of the published research paper, please contact GAP Genetics.