Demonstrating a Swedish Feeder Pig Production System in Iowa

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Summary and Implications

At the Iowa State University (ISU) Armstrong Farm in southwest Iowa, a Swedish feeder pig production system is being demonstrated. The Swedish system relies on bedding, simple buildings, intensive management, and keen husbandry for success. Gestation and breeding phases are housed in a hooped structure with individual feeding stalls. Large round bales of cornstalks are used for the deep bedded areas where the sows live in groups. A 1950s style hog house has been remodeled for farrowing, group lactation, and nursery. Farrowing cubicles with rollers and oat straw bedding are used. The hog house has been remodeled with "breathable" ceiling and exhaust fans. Oat straw is used for bedding. Two groups of Yorkshire x Landrace sows bred to Hampshire boars will produce feeder pigs in the system. Performance of the system will be documented.

Introduction

In a northern climate and under restrictive animal welfare laws and a strict ban on the use of subtherapeutic antibiotics, Swedish pig farmers have developed a management-intensive system of pig production that relies on straw, the pigs' natural behavior, group housing dynamics, and keen husbandry skills. In Sweden, the sows perform well, producing large litters of healthy pigs. The housing is simple and versatile. Farrowing and gestating crates are not used. Called "Västgötmodellen" after the region in western Sweden where it was developed by farmers during the 1980s, the system now is successfully used on approximately 100 farms in Sweden. The system is designed to produce 50 to 60 lb. feeder pigs for feeding in more conventional European-style finishing units. One version features deep-bedding, group-housed gestating sows, farrowing cubicles, and group lactation.

Because of the success of the deep-bedded Swedish system and because of the dramatic contrast it represents in comparison to conventional U.S. swine production (table 1), this project was designed to: 1) demonstrate the deep-bedded Swedish system in Iowa, and 2) identify key factors of the Swedish system which are critical to its success when practiced under U.S. conditions, e.g, climate, markets, social norms, management, breeding stock, etc.

Materials and Methods

Description of the system

The Swedish system demonstrated is known as the Thorstensson version of Västgötmodellen as documented by Algers (1991), Halverson (1991a, 1991b, 1994), and Honeyman (1995). The system is described as follows (adapted from Honeyman, 1995).

The system (Figure 1) uses group housing of sows in deep straw during breeding and gestation. During gestation the sows are fed daily in individual feeding stalls with rear gates that the farmer closes after the sows have entered the stalls. The stalls also have front access gates that open into the feeding alley. The stalls offer the advantages of individual stalls: individual feeding, control of the sow for vaccinations and artificial insemination, and easy sorting of sows. The group housing helps stimulate estrus and reduce stress on the sows by allowing them to live in groups, which they prefer. Fighting is minimized by using feeding stalls and introducing new sows to the groups at optimum times, such as at farrowing. Conception rates are high, sow longevity is long, and sow mortality and culling rates are low.

The producer keeps exact records of breeding. The pregnant sows are moved from the gestation area to a lactation room as a group. Pregnant gilts are added to the group at this time. Temporary farrowing cubicles are set up in the lactation room. The cubicles are removed when the pigs are about two weeks old.

The lactation rooms are large and quiet. They are approximately square, with a solid concrete floor, a large access door for delivering straw (usually large round bales) and removing manure, automatic waterers, and a raised feeding platform. Usually no supplemental heat is used in the rooms. Animal heat, bedding pack heat, and the straw bedding provide a good environment for the pigs.

While the pigs are from two to five weeks of age, they and the sows occupy the lactation rooms. During this time the sows are allowed free access to feed and water and the pigs begin consuming feed, often with the sows. Pig mortality is low, about 6% (Halverson, 1991a). Straw is added often, usually daily, when the pigs are inspected. Within the group the pigs' age varies by only 3 to 5 days. At nursing, the sows position themselves around the room. Some cross-suckling occurs, but it is not a problem because of uniform pig age and size. The quiet rooms allow for good sow-pig communication. Many producers grind off the pigs' needle teeth to minimize fighting injuries. Sow lactation problems (e.g., mastitis, metritis, and agalactia) are almost nonexistent, probably because the sow has plenty of exercise and consumes some straw as a fiber source,

and because stress is low. The sow's feed intake and milk output are high, which results in rapid pig growth.

At five or six weeks of age the pigs are weaned by moving the sows back to the breeding/gestation area. Weaning stress is minimized by removing the sows rather than the pigs. The piglets are fed in the lactation rooms as a group until about 55 lb. or 14 weeks of age, when they are moved to a finishing unit, which is usually at a different location.

Results and Discussion

Replicating the Swedish system in Iowa

Duplicating the Swedish system in Iowa presented several challenges. The ISU Armstrong Research and Demonstration Farm, Lewis, Iowa (Pottawattamie County), was selected as the site for the demonstration. The farm was new to the ISU farm system in 1993 and is owned by the Wallace Foundation for Rural Research and Development, a non-profit group interested in sustainable agriculture. In addition the farm is located in southwest Iowa where summer temperatures and humidity should be extreme for Iowa and test the system for heat effects.

Breeding and gestation phases are housed in a hooped structure (37 ft. x 70 ft.). The hooped structure is oriented north-south and consists of 6-ft. wooden side walls and an arched tubular frame covered by a polyethylene cover or tarp. The structure is marketed by Cover-All,[1] Clarinda, Iowa, and was erected by the farm staff during fall 1995. In Sweden, a variety of naturally-ventilated buildings, including old barns, are used for breeding and gestation; thus the new hooped structure seemed to be an analogous choice. The floor plan (Figure 2) followed Swedish concepts of lockable feeding stalls with front access doors, a feeding and service alley, a deep bedded area for the group-housed sows, bedded boar pens nearby and pen partitions that could be raised and lowered to match the height of the bedding pack. The feeding stalls and energy-free waterers were placed on an 18-in. concrete platform (Figure 3). A wooden observation deck was built along the outside of the north end of the structure to accommodate visitors. All floor areas of the hooped structure are concrete. Access for adding bedding is from the south end. Large round bales of cornstalks are used for bedding. Swedish guidelines for bedded space of 27 sq. ft. per gestating sow were followed. The structure is naturally ventilated and drippers were installed over the feeding stalls.

Yorkshire x Landrace F_1 gilts (17 head) and two Hampshire boars arrived in the gestation unit during March 1996. Breeding began on May 14, 1996, and 14 gilts were bred using natural service (hand mating) and artificial insemination (AI). Most pig farms in Sweden use Yorkshire x Landrace boars on Hampshire sows. The second group of gilts (13 head) arrived in June 1996. Fifteen gilts were bred beginning Aug. 1, 1996, using natural service and AI. The first group of gilts were due to start farrowing Sept. 5, 1996. The second group was due to farrow Nov. 24, 1996.

The breeding/gestation unit worked well. The cornstalk big round bales for bedding were easy to use and were unraveled by the gilts into absorbent bedding. The gilts were fed daily in the feeding stalls. The summer of 1996 was generally mild. Ventilation and sow comfort was adequate at all times. The drippers were used occasionally. The gilts were generally quiet and content.

An existing 1950s style hog house (32 ft. x 48 ft.) was retrofitted for farrowing and nursery. Remodeling started in the fall of 1995 and was completed in the summer of 1996. The building was in overall good condition. The interior walls and roof were insulated with 6 in. of fiberglass insulation. The walls were lined with 3/8 in. plastic sheets. Following Swedish guidelines, a "breathable" ceiling for the air inlet and variable speed exhaust fans were installed. The Swedish system uses this style of ventilation system to minimize drafts and noise in the lactation room. The building is oriented east-west with an insulated overhead door on the west. On the east end an observation room was constructed with viewing windows. A concrete feeding platform 12 in. high was constructed below the windows inside the farrowing room. The waterer is in the southwest corner above a floor drain. The existing concrete floor was used. Twelve farrowing cubicles 6 ft. x 8 ft. were built of plywood and the openings equipped with 3 in. PVC rollers (about 15-16 in. above the floor) to help keep the pigs in the cubicles. The entire room was bedded with oat straw.

The first group of gilts was moved to the farrowing unit on Aug. 30, 1996. Farrowing was occurring at the time this article was being written. When the pigs are approximately two weeks of age (about Sept. 15), the cubicles will be removed and group lactation will begin. Weaning is scheduled for Oct. 10, 1996, and the pigs will be moved to finishing on Nov. 11. Results of the farrowings will be reported next year.

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[1] Mention of company or product names is for presentation clarity, and does not imply endorsement by the authors or Iowa State University; nor exclusion of any other products that may also be suitable for application.

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Figure 1. Flow diagram of Thorstensson version of Swedish pig production. (Honeyman, 1995).

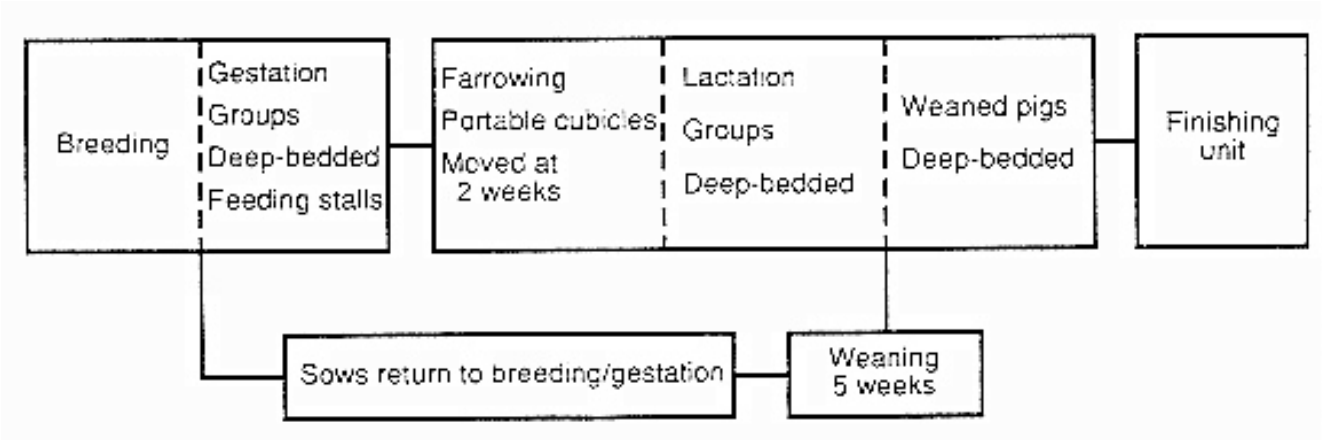

Table 1. A simple comparison of Swedish deep-bedded and conventional U.S. confinement pig raising systems.

	Sweden	U.S.
Sub therapeutic antibiotics	no	yes
Swine buildings	simple easily modified	specialized single purpose
Potential production level	high	high
Equipment	almost none	extensive
Gestation	group with straw and feeding stalls	individual stalls on slatted floors
Farrowing	free-choice cubicles with straw	raised farrowing stall with wire mesh flooring
Lactation	group with straw	raised farrowing stall with wire mesh flooring
Nursery	large groups in pen with straw	controlled environment, small groups on slatted floors
Weaning	sows removed, pigs stay in bedded room	pigs moved to hot nursery
Tail docking	no	yes
Cross-fostering	yes, by the pigs	yes, by the manager
Floors	solid concrete with straw	slats and liquid manure pits
Manure	solid	liquid
Bedding (straw)	yes	no
Pig behavior	important	not as important

Figure 2. Gestation-breeding hooped structure plan view at ISU Armstrong Research Farm, Lewis, IA.

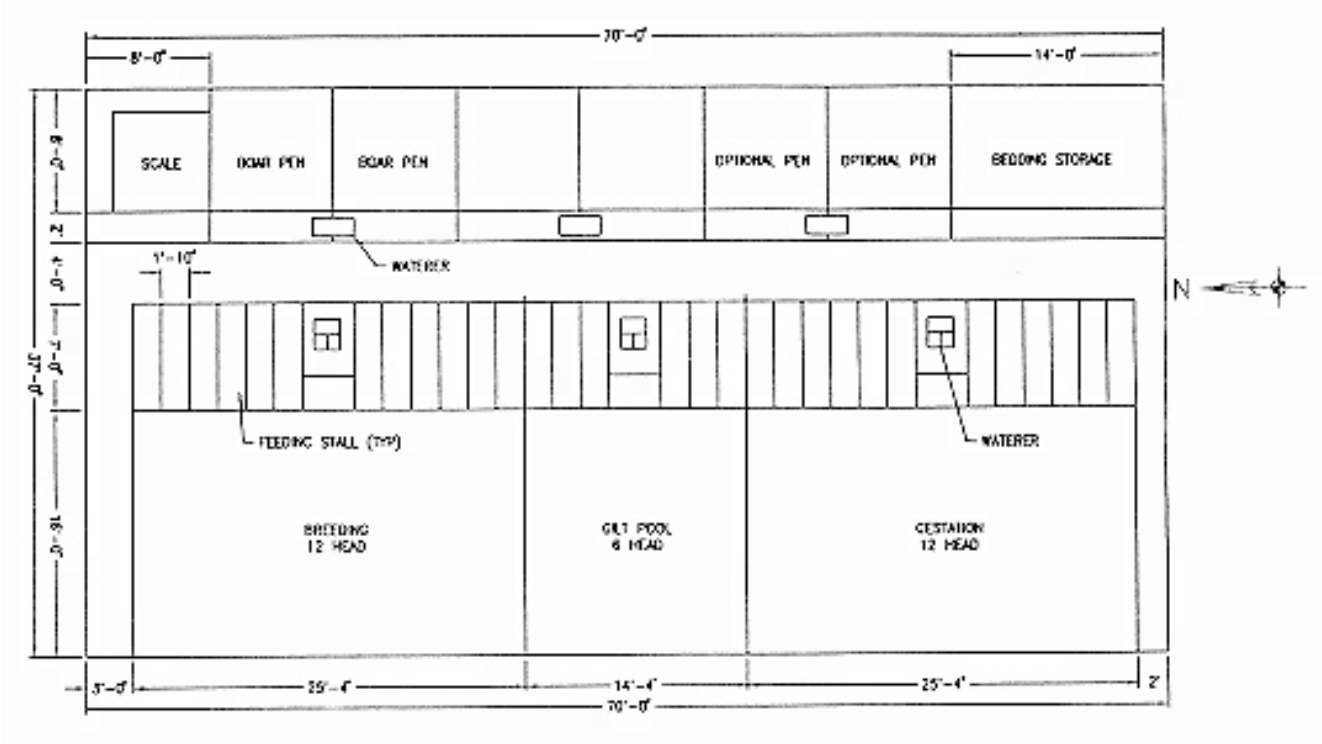

Figure 3. Gestation-breeding hooped structure end view at ISU Armstrong Research Farm, Lewis, IA.