Farrow-to-Finish in a Hoop Barn: a Demonstration

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Summary and Implications

Iowa pork producers are witnessing an increasing market demand for naturally raised pork— pigs raised outdoors or in a deep-bedded system without the use of antibiotics, growth promotants, or animal by-products. To address the growing demand for information about systems meeting natural pork protocol, the National Pork Board, Iowa State University, and private individuals formed a committee to design a farrow to finish system utilizing one hoop barn per group of pigs. Pigs were farrowed in a removable pen equipped with heated creep area. At the time of weaning, sows and pens were removed. The young pigs then stayed in the hoop barn and were fed to market weight. During the winter, an interior hoop was constructed over the rows of pens and this secondary structure was heated using a radiant tube heater.

At the ISU Allee Demonstration Farm in 2004, two groups of sows were farrowed using this design. The first group of 22 gilts farrowed 216 pigs in February or 9.8 pigs/sow. A total of 162 pigs were weaned at 5 weeks of age for an average of 7.4 pigs/sow. Energy costs for producing those animals were $8.06/pig weaned. A total of 150 animals reached market weight and were sold at 6 to 6.5 months of age. Another group of 14 second parity sows farrowed in the same facility in July. Those 14 sows produced 130 live pigs or 9.3 pigs/sow. A total of 89 pigs were weaned at 5 weeks of age for an average of 6.4 pigs/sow. At the time of this report the pigs born in July were 3.5 months old and had not yet reached market weight.

Introduction

The naturally-raised pork market is a fast growing niche in Iowa. To meet the standards of this niche, pigs must be raised outdoors or in a deep-bedded system without the use of antibiotics, growth promotants, or animal by-products. A variety of systems are currently being used in Iowa to raise pigs for the growing naturally-raised pork market. While pasture farrowing has many advantages, some producers do not have access to sites that are suitable to successful outdoor pig rearing. Furthermore, while the weather in the Midwest is most conducive to successful pasture farrowing in the spring and fall, the demand for naturally-raised pork is fairly constant throughout the year. Current production cycles in naturally-raised pork result in unmet market demand during summer when winter-born pigs are marketed. Without a constant supply of natural pork throughout the year, many vendors who would like to carry the product are unable to do so. To address this impediment to the growth of the naturally-raised pork market, farrowing systems appropriate for use in cold weather are of particular interest.

A variety of systems are currently used for farrowing naturally-raised pigs in cold weather. All generally rely upon a primary heat source capable of maintaining a room temperature of 50°F and auxiliary heat sources (heat lamps, bedding pack, hovers) to create a warmer microclimate for the young pigs. Judicious use of bedding, a design in harmony with the natural instincts of the sow, efficient use of available labor, and a breeding program that insures all females in a particular room farrow within a 7 day or less time frame, which enables successful group lactation, are key to the feasibility of such systems.

Hoop barns have been rapidly adopted by many niche market pork producers, primarily for finishing animals. Hoop barns are Quonset™-shaped structures comprised of 5 or 6 feet high sidewalls constructed of treated wood posts and sides. Attached to the top of the posts are tubular steel arches, an opaque, UV-resistant, polyvinyl tarp covers the arches forming the hooped roof. End-walls typically are also made of posts, plank, and tarp, with a large, rollable-tarp door allowing for equipment access. Typically a concrete floor is poured at one end of the barn. This concrete pad generally covers 25% of the floor space and is equipped with feeders and waterers. The remaining floor space is bedded with cornstalks or other easily procured absorptive material and is used as a communal sleeping and exercise area. These naturally ventilated structures have proven to be quite economical for raising pigs from 8 weeks old to market, and most hoop barns in Iowa are used for this purpose.

All-in all-out is a management strategy which has several advantages such as decreased labor devoted to moving and sorting pigs as well as the potential for improved herd health through segregation. With a growing interest in producing pigs for the naturally-raised pork market, the National Pork Board, in cooperation with Iowa State University and private individuals, formed a committee to design a farrow-to-finish system utilizing one hoop barn per group of pigs. Temporary farrowing pens equipped with a heated creep area would be installed within the hoop barn. Sows would farrow in these pens and have access to a common exercise and feeding area while pigs would be contained in their individual pens by an 8 inch high roller. The rollers would be removed when the pigs were large enough to begin jumping over it and group lactation would be allowed to occur. At the time of weaning, the sows and the farrowing pens would be removed. Bedding would be added as needed and the young pigs would remain in the barn until they reached market weight. To allow winter farrowing to occur in this system, a

removable interior hoop covered by an uninsulated tarp would be erected over the pens. A radiant tube heater would then be installed within the interior hoop structure with heat lamps and hovers used in the creep areas.

Materials and Methods

In early January, twin rows of metal farrowing pens with creep area were set in a 30 x 84 ft hoop barn on the Allee Demonstration Farm near Newell, IA. The general layout of the barn is diagramed in Figure 1. On top of the farrowing pens, a secondary hoop structure was erected and covered with an uninsulated tarp. The area committed to farrowing pens, creep area, and service alley were enclosed by the secondary hoop and measured 20 x 60 ft. To decrease draft and hold heat within the interior hoop, the exterior walls of the pens were covered with plastic housewrap and individual pen doors were outfitted with plastic strips similar to those found in meat coolers. A 60 ft- 150,000 Btu/hr radiant heater tube was mounted to the frame of the secondary hoop. Temporary electrical lines for heat lamps were also installed.

Pens measured either 6 x 6 ft or 5 by 6 ft. Each pen had a lockable door that could be used to keep a sow temporarily confined to a particular pen. At the bottom of each door, was an 8 in. high roller. The roller was removed when pigs began jumping over it, facilitating group lactation. Creep areas for all pens were 2 ft wide. Several 250 watt heat lamps and a plywood hover were utilized in all creep areas. Separating the two rows of pens, was a 4 ft service alley used by farm staff to inspect and process pigs. All sows had access to a 5 ft wide communal area running the length of the building as well as the 16 ft concrete feeding and watering station at the south end of the building. The building, excluding the sow feeding and watering station was bedded using wood chips. Wood chips create a bio-deck, allowing for wastes to filter down from the surface and away from the young pigs more rapidly than straw as well as reducing the fire hazard of heat lamps.

At the time of weaning, the sows, pens, and interior hoop were removed. Young pigs were then allowed to grow in the barn where they were born. If this system were to be successfully implemented, careful attention must be paid to the breeding program and available space. The gilts that had farrowed in February were rebred and were due to farrow again in July. The first batch of young pigs had not yet reached market weight and so was moved to another hoop barn for the final months of finishing. If a producer wanted to reap the benefits of not moving pigs between farrowing and market, they would have to choose between longer periods of non-productive sow days or having multiple hoop barns suitable for farrowing. The hoop barn was then cleaned out and the farrowing pens were once again set up. During the summer, the interior hoop was not erected. Heat lamps were used in the creep areas, and 2 large box fans were also installed to increase airflow through the barn.

Results and Discussion

This report summarizes the results of one winter farrowing-to-finish cycle as well as one summer farrowing. In February 2004, 22 gilts farrowed 216 pigs for an average number born alive of 9.8 pigs/sow. Following natural-pork protocol, pigs were weaned at 5 weeks of age. A total of 162 pigs or 7.4 pigs/sow were weaned with an average litter weight of 128 pounds. Pre-wean mortality was 25% with 94% of mortalities occurring within the first 24 hours after birth. Approximately 880 gallons of LP gas were used over the five week farrow-to-wean period. At $1.03/gallon, total expense for LP gas was $906.40 or $5.59/pig weaned. A total of 5020 kW of electricity was also used, at a cost of $0.08/kW. Total electric expense for winter 2004 was $401 or $2.47/pig weaned. Total energy cost/weaned pig was $8.06. Finishing animals reached market weight and were sold 6 to 6.5 months after farrowing. A total of 150 animals reached market weight with a 7.4% death loss between weaning and market.

Utilizing the same pens and layout as the winter-farrowed group, 14- second parity sows were farrowed in July. Those 14 sows produced 130 live pigs or 9.3 pigs/sow. Following a 5 week lactation period, 89 pigs or 6.4 pigs/sow were weaned with an average litter weight of 122 pounds. Pre-wean mortality was 31.5% indicating that winter's cold might have been easier to manage then the heat—and resulting restlessness of sows—experienced during the summer. About 90% of the pre-wean mortalities occurred within the first 24 hours after birth. During the summer, heat lamps were once again utilized in the creep areas. Energy use for the heat lamps was 403.5 kW at $0.08/kW. The energy cost for creating a warmer microclimate for the young pigs during the summer months was $0.36/pig weaned. To increase sow comfort, 2- 30 inch barn fans were installed at the north end of the hoop barn. These fans were each capable of circulating up to 6680 cubic ft of air/minute. Energy use for cooling, totaled 286.5 kW or $0.26/pig weaned during the summer months. Total energy costs for the summer farrowing was $0.62/pig weaned. At the time of this report, the pigs born in July were 3.5 months old and had not yet reached market weight.

Farrowing pigs for the naturally raised pork market presents several unique challenges. In both the winter and summer farrowing groups, pre-wean mortality in this particular design was very high. Additionally, higher energy cost, particularly during the winter might off set any facility cost advantage gained by using a low-cost but uninsulated structure such as a hoop barn. This system may be better suited for a less severe winter climate. The success of cold weather farrowing in a hoop barn may be higher with slight modifications to the demonstrated design. Farrowing pens were constructed out of metal and proved very difficult to keep warm and draft free. Use of other building materials as well as alternative designs of the interior hoop that are less prone to heat loss would be expected to improve the performance of the system.

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Figure One: Basic set-up of farrowing pens in hoop barn with interior tarp. (not to scale)