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Demonstrating Farrowing Alternatives for Small-Farms: Insulated Tents for Sows and Pigs, Project Summary

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Cover Page Footnote

This project was supported by the Hatch Act, State of Iowa Funds, and the Leopold Center for Sustainable Agriculture.

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A.S. Leaflet R3019

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Summary and Implications

Farmers raising pigs for niche markets are usually prohibited from using farrowing crates and must provide bedding and greater space per sow than typical commodity production. Because current consumer expectations dictate that pigs be produced year-round, crate-free farrowing options for cold weather are necessary and many niche pork companies will not accept new producers into their program unless they agree to farrow pigs during winter months. Several crate-free farrowing systems for cold weather have been demonstrated in Iowa, however those alternatives generally require a permanent, well-insulated structure and/or tremendous amounts of energy to provide a suitable environment for the newborn pig. Beginning farmers often struggle to include livestock on their farms due to lack of investment capital and long-term leases or other forms of land permanency. A yurt is a circular (7.3 m diameter), insulated tent which might be suitable for farrowing small groups of pigs. Over the course of 2 years, four groups of 4 sows were farrowed in a modified yurt at the Allee Demonstration Farm, Newell Iowa. Ambient temperature within the yurt was consistently 10–15°C warmer than the outside temperature during winter farrowings. Thermal conditions were more variable in the summer and pre-wean mortality was 10% higher during summer farrowings than in winter. Pre-wean mortality rates were larger than typical in the U.S. Pork Industry, but were similar to other crate-free farrowing systems. The yurt is a semi-permanent modular structure that can be modified to farrow small groups of pigs. Wide-spread adoption of commercially manufactured yurts for farrowing pigs in Iowa is unlikely, but the pig management strategies and techniques developed during the course of this project will inform the continued on-farm refinement of crate-free farrowing systems for cold weather.

Introduction

Incorporating livestock into farms is often a key aspect of improving the resiliency and sustainability of farms. Pigs fill an important niche in farmscapes and have long been a major component of financially sound family farming in Iowa. Pork production for niche markets can be less capital intensive and thus is an attractive option for some beginning farmers. Farmers raising pigs for niche markets are usually prohibited from using farrowing crates and must provide bedding and greater space per sow than typical commodity production. Because current consumer expectations dictate that pigs be produced year-round, crate-free farrowing options for cold weather are necessary and many niche pork companies will not accept new producers into their program unless they agree to farrow pigs during winter months. Developing versatile, low cost alternatives for farrowing small groups of sows in a bedded, crate-free environment during cold weather is a critical step towards achieving the larger goal of increasing the resiliency of Iowa agriculture through diversified crop and livestock farms owned and operated by young farmers.

Yurts are traditional structures that have sheltered nomadic peoples of the Asiatic Steepe for centuries and are still common throughout Mongolia as year-round dwellings. The modern yurt consists of a wooden frame covered with insulating layers of felt. The structure is then encased in a canvas tarp. The floorless structure rests directly on the soil and is held in place using tension cables and perimeter blocking. Several North American manufacturers market yurts to the American consumer in do-it-yourself kits. With slight modifications this structure may be suitable for farrowing small groups of sows during cold weather. Because of their simple construction, mobility, and adaptability to crate-free farrowing, yurts may be an attractive option for beginning farmers. This project will examine the feasibility of insulated yurts as a bedded, crate-free farrowing environment for family farms in Iowa. Wide-spread adoption of commercially manufactured yurts for farrowing pigs in Iowa is unlikely, but the pig management strategies and techniques developed during the course of this project will inform the continued on-farm refinement of crate-free farrowing systems for cold weather.

Materials and Methods

One insulated yurt kit was purchased from a domestic manufacturer (Colorado Yurt Company, Montrose, CO) in the Spring of 2012. The yurt was erected at the Allee Demonstration Farm, Newell, Iowa and modified to house pigs—solid penning material will be used to protect the fabric sides of the yurt and otherwise subdivide the interior space (see diagram 1).

This is a final report of a 2-year study. In total, four groups of 4 sows or gilts farrowed during winter and summer seasons. For each group, bred sows or gilts that were due to farrow within 3 days of each other were

delivered to the Allee Demonstration Farm several weeks prior to farrowing. Gestating sows were housed as a group on a concrete feeding floor with open front building. Approximately 24 hours prior to farrowing, the group of sows were moved into the yurt where they were each provided an individual farrowing space. For winter farrowings each sow was also provided access to a farrowing hut (6 ft long × 6 ft wide × 4 ft tall). Creep areas with heat lamps were also constructed to provide supplemental heating for young pigs. The huts provided a warmer space within the yurt and encouraged sows to farrow near the heated creep area. Feeding and watering occurred within a communal space within the yurt. Following farrrowing sows were given full access to feed, preventing aggression usually associated with group feeding of sows. During gestation, sows were provided corn stalk bedding. Wood chips were used as bedding in the yurts to reduce fire risk and encourage liquid movement away from the young pigs. Individual pen dividers were removed approximately 10 days after farrowing and the four sows and litters were subsequently managed as one group until weaning at 6 weeks of age. Throughout the project, energy inputs, bedding use, and pig performance were measured and recorded. Internal and external thermal conditions were also recorded using HOBO® Pro v2 data loggers (Onset Computer Corporation, Bourne, MA). This report summarizes results from two summer farrowings (August 15–September 27, 2012 and July 30–September 10, 2013) and two winter farrowings (February 8–March 22, 2013 and January 1–February 28, 2014).

Results and Discussion

A work crew of five men built the yurt structure in about 8 hours. Another 40 hours of labor were needed to install pens, gating, bedding, feeders, waterers, and electrical utilities. Initial costs of the yurt kit and materials needed to modify it for pig production was approximately $14,000.

Table one summarizes pig production and labor for each farrowing group over the 2-year project. The dates for summer and winter farrowing groups were selected with the intent of farrowing pigs during weather extremes—the hottest part of summer and the coldest part of winter. Although pre-wean mortality for these farrowings were much larger than typical in the U.S. Pork Industry, performance was similar to other crate-free farrowing systems.

Ambient temperature within the yurt was consistently 10–15°C warmer than the outside temperature during the winter farrowings. The lowest interior temperature during the first winter farrowing was 18.3°C, and sows were generally quite comfortable inside of the yurt. The heated creep areas were used by the young pigs throughout lactation. Initially sufficient heat lamps were provided to achieve a temperature near 35°C within the creep area, as the pigs grew larger, some heat lamps were removed.

While the 2013 winter was one of the warmest on record in Iowa, the 2014 winter was one of the most severe. Ambient temperature within the yurt remained 10–15°C warmer than outside temperatures, but interior temperatures within parts of the yurt were often below 0°C and occasionally fell below -10°C. Warm creep areas for the nursing pigs were maintained using heat lamps. Unfortunately, the combination of insulation in the yurt and heat generation by the sows was insufficient to prevent unheated drinking water from occasionally freezing.

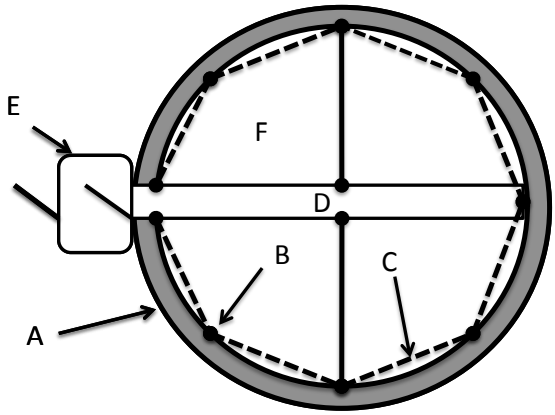
Thermal conditions were more variable during summer. Providing sufficient air movement through the yurt to keep sows cool during very hot days was extremely challenging. The interior temperature of the yurt was only 1–2°C cooler than the exterior temperature during summer. Using water to cool sows on bedding can create challenges for the young pigs, even if dry, warm creep areas are provided. The sows were generally more restless during the summer farrowing and as a result pre-wean mortality was 10% higher during summer as compared to winter. This is a trend that has been observed in most crate-free farrowing systems in Iowa.

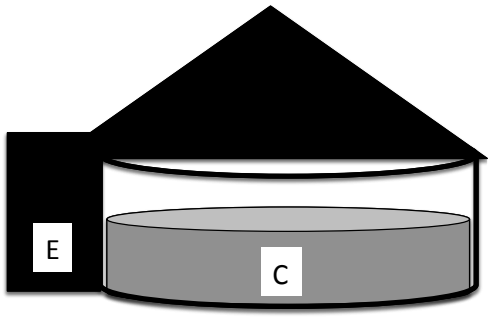
The yurt is a modular solution for farmers seeking an insulated space to farrow a small group of sows during cold weather. Although the cost of a commercially available yurt kit is prohibitive to widespread adoption of this alternative, it is likely that a more economical version could be built from recycled, locally sourced materials. Pig management strategies and techniques developed during this project will inform the continued refinement of crate-free farrowing systems for cold weather.

Acknowledgements

This project was supported by the Hatch Act, State of Iowa Funds, and the Leopold Center for Sustainable Agriculture.

Diagram 1. A circular, insulated tent layout for farrowing 4 sows
(diameter = 7.3m, height of perimeter wall = 1.8 m)





Top View of a yurt for farrowing pigs
A. Canvas exterior, felt insulation, wooden frame
B. Temporary posts
C. Solid fencing to protect sides of yurt
D. Access alley for farmer
E. Entry way with 2 doors to reduce heat loss
F. Individual farrowing pen

Side profile of a yurt for farrowing pigs
C. Solid fencing to protect side of yurt
E. Entryway with 2 doors to reduce heat loss

Table 1. Production summary for summer and winter farrowing groups housed in a yurt at the Allee Demonstration Farm, Newell, IA.

	Summer 2012	Winter 2013	Summer 2013	Winter 2014
Pregnant sows or gilts	4	4	4	3
Live pigs born	48	48	44	22
Pigs weaned	30	35	29	16
Pre-wean mortality, %	35.7	27.1	34.1	27.3

Summer = August 15, 2012–September 27, 2012 and July 30, 2013–September 10, 2013
Winter = February 8, 2013–March 22, 2013 and January 1, 2014–February 28, 2014