# Documenting Efficiencies of Heavyweight Market Pigs in Bedded Hoop Barns

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## Introduction

This study measured growth (Average Daily Gain or ADG), feed intake (Average Daily Feed Intake or ADFI), feed efficiencies, and lean/fat deposition in heavyweight market finishing pigs in bedded hoop barns. The pigs were housed in bedded hoop barns, which are of interest because of their recent popularity in the niche market for pork from pigs not reared in conventional confinement. Pigs in bedded hoop barns consume some bedding, which may impact feed utilization. Further, the thermal environment is variable and closely matches the seasonal environment. Also, the market is calling for heavier pigs and there is a lack of performance information for these weights, especially in bedded hoop barns.

The purpose of the study was to:

1. Provide growth and feed intake curves of heavyweight (240 to 320 lb) finishing pigs in bedded hoop barns and establish benchmarks for comparisons with on-farm production measures.
2. Provide feed efficiency values for the heavyweight pigs in bedded hoop barns as they gain weight through the market-weight range window.
3. Establish the relationship between rearing environment and heavyweight pig performance in bedded hoop barns.

This article reports the results from the first trial of the study which was conducted November 2014 through January 2015.

## Materials and Methods

In each trial, all pigs were housed and fed *ad libitum* in bedded hoop barns. They were fed the same corn-soybean meal diets in phase from 230 lb until market weight of 320 lb liveweight. Pigs were weighed every seven days to determine growth. When pigs reached 230-240 lb, they were scanned using real-time ultrasound to determine loin eye area (LEA) and back fat (BF). The pigs were scanned again at 320 lb to determine lean and fat deposition rates. When the pigs reached market weight of 320 lb liveweight, they were marketed.

The study will consist of several trials in different seasons to quantify the seasonal effects on pig performance. There are two pens each in three mini-hoop barns at the ISU Western Research Farm, Castana, Iowa. Each pen houses six pigs or 36 pigs each trial.

## Results and Discussion

Pigs were started at 123 lb and weighed seven times during the subsequent finishing period. Weight, feed disappearance, growth rate, and calculated feed-to-gain ratios are shown in Table 1. The target market weight was 320 lb. On the first marketing date, January 22, 2015, half of the pens were marketed averaging 321 lb, plus one large pig sold from another pen. A pig also was removed from the pen and harvested due to a prolapse. The remaining four pigs in the pen and all the pigs from the remaining two pens were marketed on January 30, 2015 at 323 lb because the goal was weight constant marketing at approximately 320 lb. In the far right column

of Table 1 is data for the pigs marketed on January 30, 2015.

Overall means were ADG 2.48 lb/day, ADFI 8.12 lb/day, FE 3.28 lb feed/lb gain from 123 lb to market.

The trial showed interesting results. Normally, we expect that a pig becomes less efficient as average weight increases because the pig is fattening and thus requires more feed per unit of gain. However, in this trial, the feed-to-gain ratio was least efficient (4.27) from December 24–31 as the average pig weight increased from 253 to 268 lb. Interestingly, the pigs became more efficient each feeding period through January 22 as they grew heavier and fatter. The 299 to 321 lb feeding period from January 14–22 had a feed-to-gain ratio of 3.28.

Fat deposition was typical, starting at 0.64 in. of backfat on December 15 when the pigs averaged 230 lb and increasing to 1.01 in. of backfat on January 22 at 321 lb. Because the pigs were exposed to colder air temperature and rapid changes in temperature outside of their thermoneutral zone, the amount of feed used by the pig to maintain warmth varied.

Colder and more variable temperatures increased the maintenance requirement of the pigs resulting in poorer feed conversion and slower gain. December 24–31 showed a marked reduction in ADG (2.16 vs 2.57 lb/day a week earlier) and ADFI remained relatively constant (9.22 vs 9.29 lb/day a week earlier). Table 2 shows the average high and low temperatures during that period.

The week of December 25, 2015 was very cold (Table 2) and the feed efficiency was 4.27. The next week also was very cold and extremely variable (Table 3). The result was 4.12 feed conversion, a poor effeciency. Growth rate slowed to 2.10 lb/day ADG compared with 2.57 lb/day two weeks earlier.

The interesting feeding period for this set of pigs was from January 15–22, 2015 as temperatures approached the thermoneutral zone (Table 4). Pig weight increased from 299 to 321 lb and ADG was 2.69 lb/day resulting in a feed conversion of 3.28.

For this trial, cold and variable temperature well below the pigs' thermoneutral zone influenced feed conversion and gain more than the heavier weight and increased fat deposition of the pigs. As temperatures became warmer and more constant, pig performance improved dramatically with better gain and feed conversion and slightly less feed intake.

Pigs fed in bedded hoop barns can achieve superior performance at temperatures near the thermoneutral temperatures. Feed conversion was very good for this set of pigs during the moderate temperature period following temperature extremes. Liveweight did not influence feed conversion as much as low/variable temperature stress. Pigs in bedded hoop barns may even compensate during periods of mild weather for periods of extreme weather. Marketing, following a mild temperature period, had improved feed conversion compared with the variable, cold-feeding periods.

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**Table 1. Incremental average daily gain (ADG), average daily feed intake (ADFI), feed-to-gain ratio (FE), backfat, loin eye area (LEA), and the high and low average temperature Farenheit (F°) for pigs fed to heavy weights in bedded hoop barns.**

| | Weigh date | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **11/6/14** | **12/4/14** | **12/15/14** | **12/24/14** | **12/31/14** | **1/7/15** | **1/14/15** | **1/22/15** | **1/30/15** |
| Weight, lb | 123 | 195 | 230 | 253 | 268 | 283 | 299 | **321** | 323 |
| ADG, lb/day | | 2.60 | 3.16 | 2.57 | 2.16 | 2.10 | 2.33 | 2.69 | 1.98 |
| ADFI, lb/day | | 6.84 | 8.39 | 9.29 | 9.22 | 8.58 | 8.97 | 8.81 | 8.27 |
| FE, lb feed/lb gain | | 2.64 | 2.67 | 3.68 | 4.27 | 4.12 | 3.87 | 3.28 | 4.04 |
| BF, in. | | | .64 | | | | | 1.01 | 1.11 |
| LEA, sq in. | | | 6.10 | | | | | 7.87 | 7.69 |
| High °F | | 36 | 44 | 33 | 24 | 19 | 23 | 44 | 45 |
| SD | | 13 | 8 | 5 | 13 | 13 | 8 | 6 | 6 |
| Low °F | | 17 | 30 | 25 | 8 | 1 | 1 | 28 | 26 |
| SD | | 10 | 9 | 8 | 13 | 8 | 8 | 3 | 5 |

**Table 2. Temperatures (high and low) during week of December 25, 2014, for pigs in bedded hoop barns.**

| Date | High | Low |
|---|---|---|
| 12/25/2014 | 44.9 | 25.8 |
| 12/26/2014 | 32.0 | 26.3 |
| 12/27/2014 | 26.3 | 11.9 |
| 12/28/2014 | 29.4 | 10.5 |
| 12/29/2014 | 19.0 | -2.5 |
| 12/30/2014 | 2.0 | -7.8 |
| 12/31/2014 | 16.5 | -7.6 |

**Table 3. Temperatures (high and low) During week of January 1, 2015, for pigs in bedded hoop barns.**

| Date | High | Low |
|---|---|---|
| 1/1/2015 | 30.8 | 9.8 |
| 1/2/2015 | 33.7 | 15.3 |
| 1/3/2015 | 35.3 | 5.5 |
| 1/4/2015 | 6.3 | -4.9 |
| 1/5/2015 | 13.3 | -2.7 |
| 1/6/2015 | 11.4 | -4.5 |
| 1/7/2015 | 3.8 | -8.7 |

**Table 4. Temperatures (high and low) During week of January 15, 2015, for pigs in bedded hoop barns.**

| Date | High | Low |
|---|---|---|
| 1/15/2015 | 38.9 | 22.6 |
| 1/16/2015 | 48.0 | 25.2 |
| 1/17/2015 | 47.4 | 33.8 |
| 1/18/2015 | 50.8 | 29.8 |
| 1/19/2015 | 49.2 | 29.3 |
| 1/20/2015 | 43.9 | 30.7 |
| 1/21/2015 | 33.5 | 27.6 |
| 1/22/2015 | 36.5 | 25.4 |