

Sponsors

University of Minnesota

College of Veterinary Medicine

College of Agricultural, Food and Environmental Sciences

Extension Service

Swine Center

Experience and field data on alternative pen sizes

Paul D. Ruen, DVM

Fairmont Veterinary Clinic, Fairmont, MN

Background

Management of the weaned pig has become a dynamic area over the past eight to ten years. The swine industry has adopted—with varying degrees of success—many new technologies that impact the wean-to-market pig:

- complex starter diets
- multisite production
- single-source pigflow
- health pyramids
- gilt-isolation/acclimation
- segregated weaning (sometimes early)
- McRebel®
- wean-to-market facilities
- health diagnostics (PCR, IHC, and others)
- budget feeding
- records/information systems

Dr. Camille Moore thoroughly evaluated various strategies used to improve performance in the nursery/grow/finish herd.¹ This renewed attention to the growing pig is financially justified since the wean-to-market herd incurs the greatest portion of expenses in the farrow-to-finish model, the largest of those expenses being feed and facility costs (**Figure 1**). Therefore, growth performance—as measured by ADG, F/G, Lbs Generated/ft², and % PreMarkets and Deads for groups of wean-to-market

pigs—has a tremendous impact on farm profitability. Any technology that optimizes these measures, minimizes facility costs, or is “people-” or “pig-friendly” needs a closer look for application on-farm.

Placing larger numbers of pigs in a pen together at conventional stocking densities is one technology being evaluated in our practice. It is not a “new” method of housing, having been used in Europe and the U.S. in more extensive rearing situations, typically. For the past three years farms have been experimenting with pig numbers of 75–600 pigs/pen, most commonly at 100–150/pen. The reasons we had for challenging conventional barn layouts included:

- pig behaviors
- adaptability to wean-to-market
- savings on gates and feeders
- more usable/walkable pen space
- space to establish bedroom, bathroom, kitchen
- pre-sort ahead of sale day
- pen integrity
- people-washing, walking pens
- variation within pens and groups

Design Considerations

For the purpose of this discussion, I will refer to pen densities of 75 or more as LargePen, and SmallPen will indicate those facilities with conventional numbers of 25–30/pen. The more common LargePen layouts in use in my practice area are included in **Figures 2–7**, **Figure 8** representing a common SmallPen design. The LargePen designs make the establishment of bathroom, kitchen, and bedroom much easier since distance between zones is greater than in SmallPens. In general, the 100–150/pen layouts have been successful for pig flows from 700–2800 sows. A unique challenge for LargePens is effective sorting for size and sex, and feeding of pens when weaning less than 300–400/week. Components that appear important to pen design are:

- length/width ratio

Figure 1. Production costs — wean-to-market

Camille Moore, AASP 1993

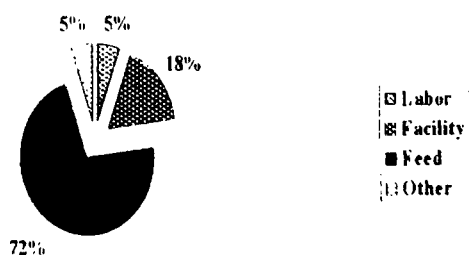
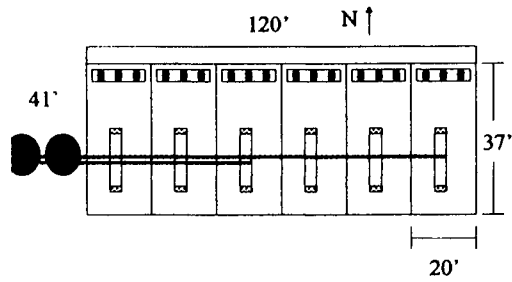


Figure 2



600 HEAD

6 PENS

100 PIGS/PEN

SPLIT SEX OR SINGLE SEX

One line only needs to be 60' long.

Only 1 feed line
Bins in tandem

Bring in tandem for
Nursery/
Emergency

Advantage in pigs finding North/South Comfort Zone

Figure 3

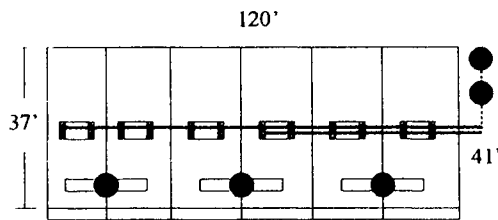


Figure 4

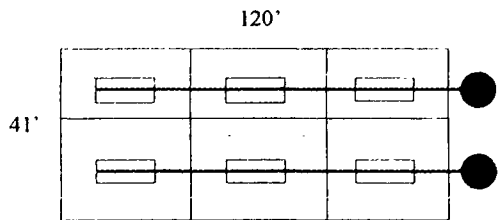


Figure 5

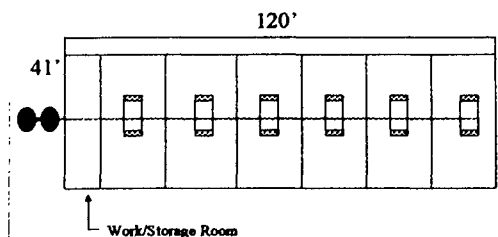


Figure 6

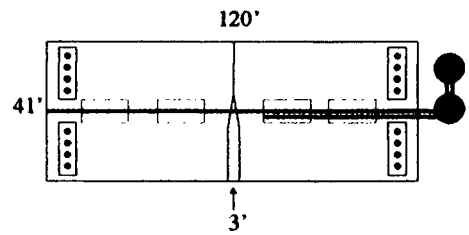


Figure 7

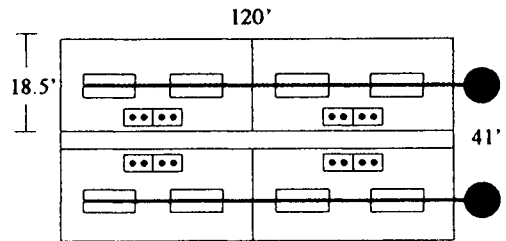
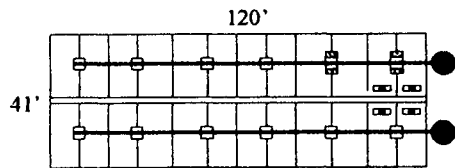


Figure 8



- racetrack
- gating for sorts, treats
- activity space

Length/width ratios

Length/width ratios that appear successful are between 1.5:1 and 4:1. There are various pen configurations in use, many that are people- and pig-friendly. While data is incomplete, it appears that pig movements suffer if pens become too long and narrow, and gating costs increase.

Racetrack

Racetrack refers to the pigs' ability to move 360° around the feeders. Pigs will walk/run around a feeder that is placed in the center of the pen. Observation indicates negative pig behaviors (e.g., tailbiting) is diminished when provided with this racetrack. This movement becomes a group activity with minimal congestion compared to pigs in SmallPens. Producers comment that pigs move easier to the truck from pens with a racetrack.

Gating

Gating that swings from the side to lock at the center feeder has made "people activities" such as treating, vaccinating, and pre-sorting market hogs easier in the LargePen

environment. It is a low-cost item that will reduce labor requirements and frustration.

Activity space

Activity space refers to a pen layout that allows some pigs to eat, some to lounge near the side gate, and others to walk between the first and second groups without disturbing those pigs. If behavior is to be modified and aggression diminished within the pen, then design needs to be cognizant of pen "pig flow."

Cost savings for gating and feeders will vary from \$3-7/ pig place, while still achieving the same number pigs/ feeder space. A feed line may also be saved depending upon pig flow. It becomes easier to maintain pen integrity from nursery to finisher with LargePens since gating during transport is easier in groups of 100+. In addition, equipment and utility costs for wean-to-market may be lower if using gas infrared heaters which can serve 200+ pigs.

Data and discussion

Summaries of data from three farms are included in this proceedings.

Dataset A

Dataset A (Table 1) consists of nursery performance for a producer with nursery to finisher pig flow. The data presented is from two contract nursery sites. Site 1 consists of three 41'x120' curtain/chimney barns with plastic floors, cup waterers, and dry stainless steel feeders. Pigs flow from a 1400 sow farm, this site receiving pigs six weeks out of eight. There are two barns on site 2, each a 41'x120' curtain/chimney barn split into two rooms of 600 head; these rooms also have plastic flooring, cup waterers, and stainless steel feeders. This site receives all the production from a 700-sow farm. Both sow farms are

Table 1. Dataset A

Measure	SmallPen	LargePen
Weight In	11.5	11.5
Weight Out	51.9	57.5
Average Days	52.8	52.0
Number In	25798	4630
Number Out	25569	4577
Number Deads	229	48
% Death Loss	0.9%	1.0%
Average Daily Gain	0.82	0.90
Feed/Gain	1.89	1.69
Average Daily Feed Intake	1.55	1.48
Number of Groups	21	8

populated from the same closed herd gilt multiplier and use the same AI liquid genetics. Health status is similar among the farms. Because of the confounding effect of Season and Group Days², only closeouts with similar days and same one year time period were used.

Performance in the nursery indicates slightly better ADG for LargePen groups. Although feeders in both barns were dry stainless steel models, they are different brands and may explain the 12% higher F/G in small pens. It is more difficult to keep feeders set correctly in the SmallPen barns.

Dataset B

Dataset B (Table 2) consists of finisher closeouts for a producer with conventionally sized nursery pens in three 60'x72' power-ventilated barns split into two rooms of 600 head. These barns are filled single source from two sow farms (500 and 1400) of the same genetics and same health pyramid. Liquid AI genetics are also identical, and health status is similar. Once pigs leave the nursery they enter curtain-sided finishers that are either 25/pen, 75/pen, 100/pen, or 150/pen. There was no statistically significant difference in performance by pig source.⁴

Low numbers of groups make interpretation difficult. In this dataset, feed efficiency is better for the LargePen groups; however, this advantage is negated when perfor-

Table 2. Dataset B*

Measure	SmallPen	LargePen
Weight In	47	36 p<0.01
Average Days	118	119
Number In	6890	5265
Average Market Weight	265	257 p<0.12
Number Marketed	6359	5240
% Marketed	92.3%	93.2%
Average PreMarket Weight	207	198
Number PreMarket Pigs	323	215
% Premarket Pigs	4.7%	3.8%
Number Deads	206	150
% Death Loss	3.0%	2.7%
Average Daily Gain	1.76	1.77
Feed/Gain	2.88	2.78
Feed/Gain ADJ 40-240*	2.72	2.71 p<0.05
Average Daily Feed Intake	5.1	4.9
Number of Groups	12	10

*Adjusted 0.05/10 lbs. over or under 40 start and 240 end weights.

mance is adjusted for lower In Weights and lower Market Weights. The trend indicates 1% more marketable pigs in LargePens. Mortality was not different among treatment groups. Although In/Out weights were lighter for the LargePen groups, ADG was not different.

In an effort to get to a better understanding of “within group” weight variation, this dataset will be analyzed using hot carcass weights for all pigs marketed. This analysis was not yet completed at the time this paper was submitted.

Dataset C

Dataset C (Table 3) consists of wean-to-market close-outs from an 1100 sow farm just completing a roll-over from conventional nursery/finisher flow to wean-to-market facilities. The information presented from this farm is combined Nursery/Finisher data from groups weaned into LargePen nurseries, then moved with group integrity to finishers with either LargePens or SmallPens.

Age and weight at weaning was the same for both groups. There were 1% fewer deads in LargePens and 1.5% more marketable pigs. ADG, ADFI, and F/G were similar.

Summary

Although there are limitations to this production data, the available information at least indicates that LargePen performance is on par with SmallPen. In addition there are some cost savings in gates, and labor advantages in cleaning barns. Producers utilizing LargePens comment that labor savings in wash time is approximately 4 hours/1000 head barn.

Table 3. Dataset C

Measure	SmallPen	LargePen
Age In	15.1	15
Weight In	10.7	10.8
Number In	15227	9602
Average Market Weight	257	255
Number Marketed	13890	8915
% Marketed	91.2%	92.8%
Average PreMarket Weight	182	181
Number PreMarket Pigs	348	256
% Premarket Pigs	2.3%	2.7%
Number Deads	867	446
% Death Loss	5.7%	4.6%
Average Daily Gain	1.43	1.41
Feed/Gain	2.69	2.68
Average Daily Feed Intake	3.8	3.8
Number of Groups	15	16

Treating individual pigs is more difficult in LargePen barns, but walking the barn is easier with fewer gates to cross. A new method is needed to sort and market pigs; presorting with gates is a positive benefit. More data is needed to analyze performance, variation, and profitability effects of LargePens. Today, LargePen is a no/low risk proposition that bears a look.

Acknowledgments

The author wishes to thank Dr. JL Xue, U of MN, for his assistance in statistical analysis of finisher and carcass data.

References

1. Moore, C. 1993. Striving For Optimum Nursery/Grow-Finish Performance: More Than One Option Exists. Howard Dunne Memorial Lecture, Proceedings of AASP, Kansas City, MO. pp. 205-269.
2. Rademacher, C. et al., 1997. Benchmarking: Building a Regional Database and Establishing Performance Targets for the Growing Pig. Proceedings of AASP, Quebec City, Quebec. pp. 271-281.
3. Fairmont Veterinary Clinic PigCHAMP® Bureau. 1998.
4. SAS® 1998. Statistical Analysis Software.

