SORTING NURSERY AND GROWING-FINISHING PIGS BY WEIGHT FAILS TO IMPROVE GROWTH PERFORMANCE OR WEIGHT VARIATION

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The sorting and grouping of pigs by body weight is a common management technique believed to minimize variation in final pig body weights, and therefore to more efficiently achieve packer weight specifications. Thus, pigs commonly are regrouped at several stages during the production cycle (i.e., at weaning, placement into the grower and (or) finisher unit, and possibly again after an initial marketing of pigs from a barn).Reductions in weight gain as a result of regrouping pigs either have been undetected;[1] evident only within the first week or two after regrouping;[2,3] or apparent only when coupled with other stressors such as limit feeding, increased stocking density, or high ambient temperatures.[4,5,6] However, Stookey and Gonyou[7] proposed that pigs should not be regrouped after marketing heavier pen mates because of the associated physical and social stresses. Results of other studies have been inconsistent when pigs were sorted into uniform groups by body weight. An early study from Great Britain[8] utilized groups of pigs that initially were of identical average weight but with high or low variation in weights. The uniformity in body weights was lost by the end of the study. Similarly, Gonyou[9] concluded that sorting pigs by weight was not necessary, because productivity was not affected negatively by within-pen weight variability. However, a report from the Netherlands[10] indicated that growth performance was better when initial within-pen weights were uniform than when weight variability was high. In a literature summary, Gonyou concluded that it was not possible to determine what effect variation in weight might have within a particular group of finishing pigs.[9]

Therefore we conducted two experiments to investigate the effects of initial within-pen pig weight variation on growth performance and weight variation in nursery and finishing pigs.

Nursery Experiment

This study was conducted in a commercial finishing facility in Southwestern MN. A total of 72 pens of pigs with 21 or 30 pigs per pen were used. Only growth data was collected and feed intake was not measured. However, a standard KSU Nursery feed budget was followed. All pigs, regardless of initial weight category were fed the same amounts of their respective diets. Pigs were weaned at an average of 18 days of age with no pig less than 16 days of age and sorted into groups of light, medium, and heavy pigs. The unsorted groups were obtained by mixing 1/3 of a pen of light, 1/3 of a pen of medium, and 1/3 of a pen of heavy weight pigs at weaning. A second objective of this experiment was to evaluate stocking density (21 vs 30 pigs per pen) and to see if crowded or uncrowded pigs

responded differently to sorting or mixing. Growth was measured from d 0 to 53 after weaning. Experimental stocking densities included:

21 pigs per pen = 2.7 ft^2 per pig
30 pigs per pen = 1.89 ft^2 per pig

Removals were defined as pigs that died, were classified by the manager as a cull pig, or were removed during the test for other reasons. Gain per pen was defined as the total pen weight at the end of the trial - pen weight at the beginning of the trial including cull pigs, but not including any weight gain for removed pigs.

The trial was analyzed as a 3 × 4 factorial design with main effects of weight categories at weaning and stocking density.

Results and Discussion

There were no interactions between initial weight categories and stocking for any response criteria. This means that growth or removal rates were not different for the different weight categories or that light or heavy pigs benefited greater from stocking density. Therefore, the remaining graphs are presented as main effect means of either weight categories or stocking density.

As expected the pigs in the 21 pig pens were heavier (2.6 to 4.5 lb; $P < 0.05$) than the 30 pig pens. Also as expected the 21 pigs per pen resulted in the lowest removal + cull rate compared with 30 pigs per pen (3.4 vs 5.4%; $P < 0.05$).

Sorting by Weight at Weaning

As expected the light, medium, and heavy pigs had similar rankings at the end of the nursery phase (Figure 1) with the unsorted being intermediate in weight between the medium and heavy weight sorted pigs. In fact, the unsorted pigs averaged 1.5 lb heavier upon exit from the nursery than the average of the light, medium, and heavy categories. While the interaction was not significant it does appear that the weight advantage for the unsorted pigs was greater in the 21 pigs/pen category than the 30 pig/per pen category (Figure 2). The pigs in the unsorted 21 pig pens were significantly heavier (2.6 lb, $P <.02$) than the mean of the three sorted categories. The pigs in the unsorted 30 pig per pen categories were not significantly heavier. However, there certainly was no weight advantage to sorting by initial weight. Furthermore, the removal + cull percentage was similar for the sorted vs unsorted categories (4.2 vs 4.6%; Figure 3).

Based on the results of this trial there was no justification for sorting pigs by weight at weaning into the nursery when pigs are at least 16 d of age. In fact, it could be argues that sorting pigs by weight in the nursery could even have some negative implications on growth rate.

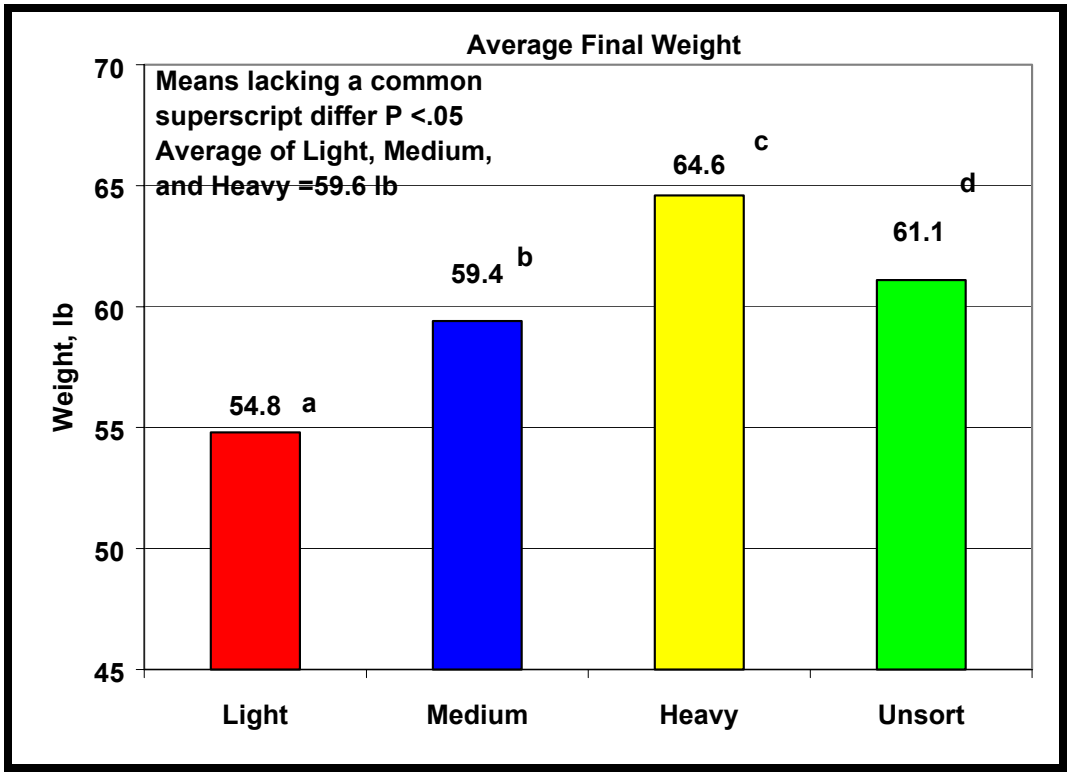

Figure 1, Average Final Weight of Pigs

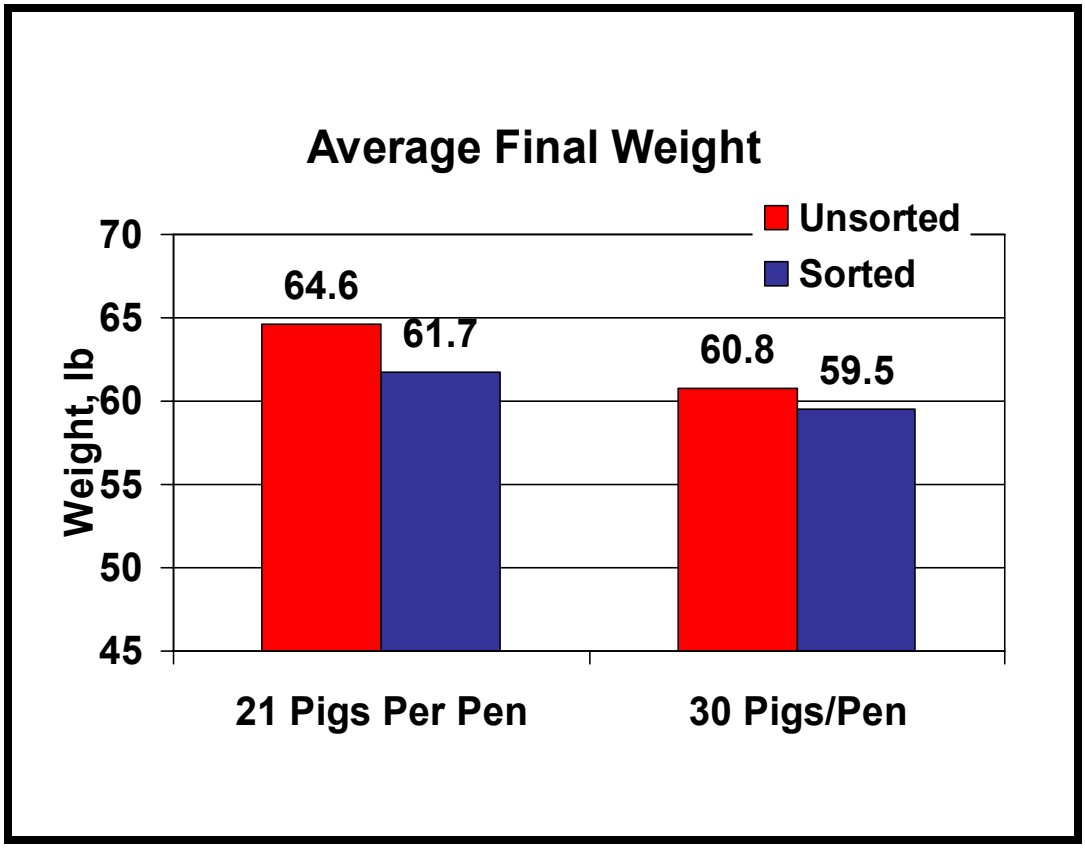

Figure 2, Average Weights by Sorting and Stocking Density

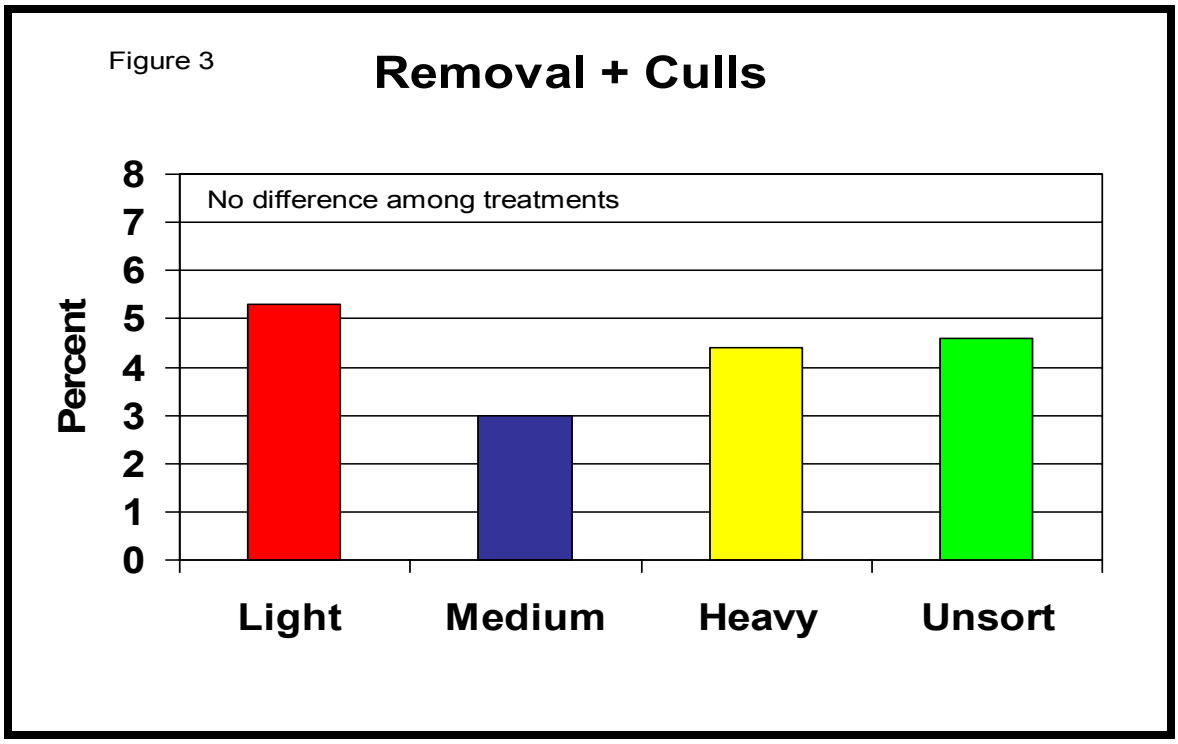

Figure 3, Removal and Culls Among, Sorted (heavy, medium, and light) and Unsorted Pigs

In the finishing experiment, two sequential trials were conducted. In each trial, we allotted 192 crossbred (PIC L326 or 327 boars × C22 sows) barrows and gilts, approximately 14 weeks of age and 75 lb, to one of four experimental groups:

1) Uniformly heavy; initially weighing 81.5 ± 3.1 lb;
2) Uniformly medium; initially weighing 75 ± 1.7 lb;
3) Uniformly light; initially weighing 66.0 ± 4.4 lb;
4) High variation, medium weight (Unsorted); initially weighing 75 ± 7.7 lb

In each trial, approximately 250 pigs were available to select from, and in each case, pigs weighing more than three standard deviations from the group average (about 12 pigs) were removed from consideration. Thus, extremely heavy or extremely light pigs were not used. The remaining pigs not used in the study were selected across the weight groups so as not to disrupt the normal weight distribution. In each trial, pigs were utilized from a single farrowing group that farrowed over a 7-d period. The unsorted pens were created by taking equal thirds from each of the uniformly heavy, medium, and light groups. Each trial consisted of four blocks of the four experimental groups with pigs housed 12 per pen providing 8.0 ft^2/ pig. Thus, the overall experiment included eight observations per treatment group.

For the overall growth period (d 0 to 91, Table 1), uniformly heavy and unsorted pigs had similar ADG (P>.05), and both had higher (P<.05) ADG than the uniformly medium and light pigs, which were similar (P>.05). Additionally, the ADG of unsorted pigs was higher (P = .03) than the mean ADG of sorted pigs. No differences (P>.05) were observed for ADFI over the total trial, and F/Gs were similar (P>.05) for uniformly heavy pigs, lowest for uniformly light pigs, and intermediate for unsorted and uniformly medium pigs.

At the termination of the study (d 91), uniformly heavy pigs were heaviest, followed by unsorted, uniformly medium, and uniformly light pigs. All four groups were significantly (P<.05) different, and the final weight of unsorted pigs was heavier (P=.03) than the average final weight of all sorted pigs.

Within-pen variation at the start of the trial (Table 2) was smallest (P<.05) for uniformly medium pigs and greatest for unsorted pigs. The variations of the four experimental groups were different (P<.05) at the start of the trial. As time on test progressed, differences in within-pen variation among the three-sorted groups and unsorted group diminished and were not different at the end of the study compared with the unsorted pigs.

Recommendations and Procedures for Filling Rooms (or Barns)

When moving weanling pigs into a nursery room:

1. Sort out the 10 to 15% of the very lightest pigs. These pigs will include any lame pigs, runt pigs, ruptures or any other pigs that will require specialized attention and care. These pigs are typically put into “hospital” or “disadvantaged pig” pens. They will be allowed a more generous (increased amounts) of the initial starter diets.
2. The remaining 85 to 90% of the pigs get randomly placed in pens without any special attention to initial weight. These pigs will be fed the standard amounts of feed according to the feed budget.

If you will be:

1. Feeding the entire room or each individual pen a different feed budget;
2. Managing individual pens of pigs differently, i.e., vaccinations, environmental modifications or any other management procedure that will be weight specific, then it is probably worth the added labor to sort pigs by weight.

The same procedures (perhaps with the exception of a different diet for the disadvantaged pigs) would be used for moving pigs into a finishing barn. Remember that if you think sorting pigs be weight in an attempt to market the “heavy” pens first, followed by the “medium” pens and “light” pens will not be effective. This is because a uniform group of pigs at placement will have similar weight variation at marketing as pigs not initially sorted. Also by marketing whole pens, the resulting unused space drastically the efficiency of space utilization within the barn.

Conclusions

These data indicate that sorting pigs uniformly by weight may not be necessary for maximum growth performance. End-point variability in individual pig weights within a pen is unaffected by sorting strategy. Additionally, eliminating sorting of nursery finishing pigs upon placement may improve throughput (amount of pork produced) within a production system. This is both true for nursery and finishing pigs. Producers should not sort pigs closely by weight at placement in the barn in the hopes of reducing variability in growth performance. The only exceptions to this management strategy are if pigs are obviously disadvantaged (lame, ruptures, exceptionally small for their age) and/or if you would plan on feeding pigs different diets based on initial weight (i.e., if light, medium, and heavy pens of pigs would all have different feed budgets).

Table 1. Growth Performance and Average Pig Weights[a]

Item	Sorted Pens			Unsorted	CV	Sorted vs Unsorted P <
	Heavy	Medium	Light			
day 0 to 91						
ADG, lb	2.07[b]	2.03[c]	2.01[c]	2.07[b]	2.08	.03
ADFI, lb	5.89	5.86	6.01	5.95	5.37	.84
F/G	2.85[b]	2.93[bc]	3.02[c]	2.88[bc]	5.46	.46
Average Pig Weights on Day, kg						
0	81.7[b]	75.0[c]	66.6	74.5[c]	1.29	.64
91	272.0[b]	259.7[c]	249.5[d]	264.3[e]	1.58	.03

[a]Values are means of eight replicate pens (with 12 pigs per pen) per treatment (initial average pen weight of 33.8 kg).[11]
[b,c,d,e]Means in a row with different superscripts differ (P<.05).

Table 2. Average Within-Pen Weight Variation (SD)

Day	Sorted Pens			Unsorted	CV	Probability Sorted vs Unsorted
	Heavy	Medium	Light			
0	3.09[a]	1.71[b]	4.47[a]	6.96[c]	15.61	.0001
91	16.24	16.67	20.40	19.22	28.64	.50

[a,b,c]Means in a row with different superscripts differ (P<.05).[11]

Literature Cited

1. Friend TH, Knabe DA, Tanksley TD Jr. Behavior and performance of pigs grouped by three different methods at weaning. J Anim Sci. 1983;57:1406–1411.

2. McGlone JJ, Curtis SE. Behavior and performance of weanling pigs in pens equipped with hide areas. J Anim Sci. 1985;60:20–24.

3. Gonyou HW, Parfet KAR, Anderson DB, OlsonRD. Effects of amperozide and azaperone on aggression and productivity of growing-finishing pigs. J Anim Sci. 1988;66:2856–2864.

4. Scherritt GW, Graves HB, Gobble JL, Hazlett VE. Effects of mixing pigs during

the growing-finishing period. J Anim Sci. 1974;39:834–837.

5. McGlone JJ, Stansbury WF, Tribble LF. Effects of heat and social stressors and within-pen weight variation on young pig performance and agonistic behavior. J Anim Sci. 1987;65:456–462.

6. Gonyou HW, Stricklin WR. Effects of floor area allowance and group size on the productivity of growing/finishing pigs. J Anim Sci. 1998;76:1326–1330.

7. Stookey JM, Gonyou HW. The effects of regrouping on behavioral and production parametersin finishing swine. J Anim Sci. 1994;72:2804–2811.

8. Tindsley WEC, Lean IJ. Effects of weight range at allocation on production and behaviour in fattening pig groups. Appl Anim Behav Sci. 1984;12:79–92.

9. Gonyou HW. Sorting and mixing of grower/finisher pigs. Proc Allen D. Leman Swine Conference. 1998;25:126–128.

10. van de Loo DJPH, Hoofs AIJ, Swinkels JWGM. Strategies for stocking weaned piglets and fattening pigs. Research Reports 1997, Research Institute for Pig Husbandry, Report P 5.5. Rosmalen, The Netherlands. 1998;48.

11. O'Quinn, P.R., Dritz, S.S., Goodband, RD ,Tokach, MD, Swanson, JC, Nelssen, JL and Musser, RE. 2001. Sorting growing-finishing pigs by weight fails to improve growth performance or weight variation. Swine Health Prod. 9:11.