Swine Feed Efficiency: Influence of Market Weight

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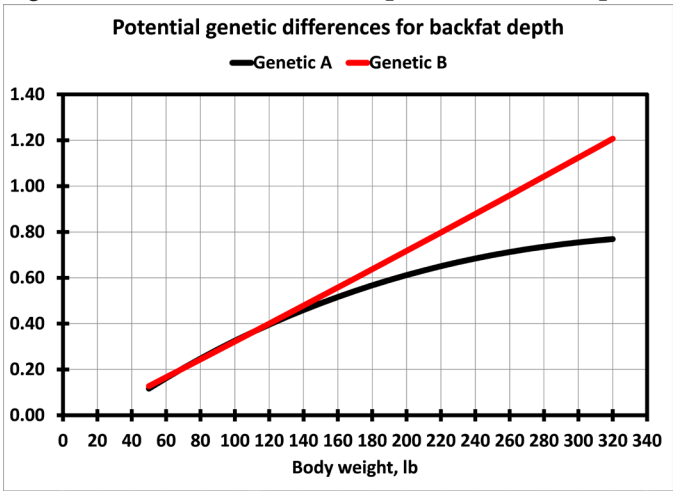
Introduction

To understand the reason that F/G becomes worse as pigs mature, it is important to understand the physiology of growth. During the growth cycle of a pig, the pounds of feed required per pound of gain increases, or said another way, the feed efficiency becomes worse as the pig's weight increases. Because it is more efficient to build muscle than fat, the efficiency of converting feed to live weight gain is best for young pigs and declines as pigs grow larger and older. Early growing pigs convert dietary feed at less than 2:1 F/G while finishing pigs convert feed at over 3:1 F/G. The poorer feed efficiency is caused by two major factors. First, the feed required for maintenance relative to lean growth increases as the pig gets larger. Second, the composition of gain shifts from primarily lean growth to a larger segment of lipid accretion as a pig approaches mature weight. Therefore, the mature frame size of the genetics is an important factor in feed efficiency near market weight. Early maturing pigs enter the less efficient fattening phase at a lighter final weight. Modern high lean genetics typically stay in the lean growth phase longer (Figure 1).

Understanding the differences in lean and fat deposition curves is important for feeding programs and marketing decisions. Genetics that have higher lean potential are more efficient in converting feed than those of lower lean gains. Therefore, the influence of market weight on feed efficiency is less for high lean pigs, because they enter the fattening phase of production at higher market weights. The decision for optimal market weight is influenced by the feed efficiency curve, the packer grid/matrices and the feed cost per pound of gain.

Figure 1. Genetic Potential Impacts Backfat Depth



Feed Efficiency at Market Weight

Table 1 provides an example of pig performance expectations for high lean pigs in a commercial production system from 240 to 280 lb. Although feed efficiency increases as pigs get heavier, it is not at the same rate as other genetics that mature earlier.

Table 1. Feed to Gain Ratios for Contemporary High Lean Genetics (data collected by Dr. Matt Swantek)

	Weight Range, lb			
Item	240-250	250-260	260-270	270-280
Average daily gain, lb	1.97	1.95	1.94	1.92
Average daily feed intake, lb	6.82	7.12	7.48	7.84
Feed/gain	3.46	3.65	3.87	4.09

The weight range in Table 1 covers the weight range of most packer grids with F/G increasing from 3.46 to 4.09; an 18.2% loss in feed efficiency comparing a 245 lb pig to a 275 lb pig. The impact of F/G at heavier weight will also impact the cumulative feed efficiency on the final closeout. Using the same data as in Table 1, cumulative wean-to-finish feed efficiency increases as market weight increases (Table 2).

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Table 2. Cumulative Performance at Different Final Weights.

	Weight Range, lb			
Item	250	260	270	280
Average daily gain, lb	1.49	1.50	1.51	1.53
Average daily feed intake, lb	3.85	3.95	4.06	4.17
Feed/gain	2.59	2.63	2.68	2.73
Days on feed	160	165	170	176

In contrast to the data from modern, high lean pigs in Table 2, data from Headley et al. (1961) shows the extreme difference in genetic improvement over the last 50 years. Their data showed that F/G was 3.5 for a 160 lb pig, 4.1 for a 200 lb pig, and 4.4 for a 220 lb pig.

Because there are genetic maturity differences and different feeding strategies between lines of pigs, F/G from 250 to 280 will vary. There are only two methods to determine the final stage F/G ratios: incrementally weigh feed disappearance and pigs over time, or use accurate closeout records. It is important to calculate the incremental F/G at different end weights for your genetics and feed management. This can be done by mathematically converting cumulative F/G to incremental ratios. The incremental ratios can then be used as part of the target weight marketing decision.

Removing Heavy Pigs From Pens Improves F/G

Another consideration related to market end weight F/G is marketing strategy. The first marketing of the barn is important, as the heaviest pigs must be properly identified and a relatively constant number of pigs should be removed from every pen. Once removed, growth rate and F/G will improve for pigs remaining in the pen (DeDecker et al., 2005). Removing 25% of the pigs at 19 days before marketing resulted in more total weight marketed (0.3%) and a 17 lb feed savings per pig in the study. Higher removal rates had more feed savings (52.6 lb), but less pen weight sold (3.3%). Initial stocking density (space per pig) will have a major influence on the impact of sorting strategy on F/G. As stocking density increases, the benefit of removing pigs on growth of the remaining pigs in the pen increases.

Conclusion

Good decision making regarding target market weight is multi-faceted. For maximizing profit, consideration of all the factors involved is critical, including: feed efficiency, return over variable cost, packer grids and their premium and discount schedules, ability of stockman to sort heavy pigs, seasonal market cycles and pig removal strategies.

Understanding on-farm growing and finishing pig feed efficiency and growth curves are important to determine the optimal marketing strategy. High lean genetics may be taken to heavier weights with less effect on feed efficiency. Every operation should independently evaluate the F/G near market weight from records as an important piece of determining target end weight. Other considerations when making a target weight decision include: knowing and utilizing pigs removal strategies, selection strategies to market the correct pigs, packer weight grids (including discounts and premiums), and seasonal market cycles.

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