KEY MEASURES OF PERFORMANCE IN THE GROWING-FINISHING BARN FOR INFORMED DECISION MAKING

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INTRODUCTION

Excellent record keeping systems for sows have been around for over 20 years. High quality, reliable data management systems for growing-finishing pigs are only starting to become publicly available. Thus, producers are less familiar with the key performance measurements, how they are calculated, what they mean, and what constitutes a good number. In this paper, the key performance measures and minimum data required to collect them are briefly discussed. Management changes that should be considered to improve financial return for the individual group of pigs and how to prepare the barn for another group also are addressed. Finally, methods to evaluate and reward the person in the barn on their management abilities are presented.

KEY MEASURES OF PERFORMANCE

What Measures of Performance Should be Routinely Measured in the G/F Barn for Effective Management?

Although we are in the information age and numerous tools are available to collect and store information, we need to be careful not to overload barn workers, accountants, or owners with collection and analysis of information that can not be easily summarized, interpreted and used to improve the management and financial return from the finishing barn.

The key performance measures that I encourage producers to collect on all grow-finish groups include:

- Normal growth performance (ADG, ADFI, F/G, average initial and market weight)
- Marketing information (total weight marketed, Average weight of top market pigs (those not going to a cull market, number of culls and value of culls)
- Mortality (total mortality and weekly pattern)
- Feed usage (cost and use by diet compared to feed budget)
- Facility utilization (Open days and turn days)
- Other expenses (Pharmaceutical and other expenses per pig)
- Current inventory

Numerous other measures can be collected in the barn as part of routine management. Some people make excellent use of these measures to improve their management; however, most

simply collect the data because they are told that it is important to know. These could include measures such as high/low temperature, number of daily treatments, water usage, cough scores, etc. If these data don't provide useful management improvement, they shouldn't be collected.

Can the Key Performance Measures be Obtained Practically and Routinely?

If you don't overwhelm yourself with collecting data that isn't needed, the answer is yes. Good information takes time to collect, but doesn't need to be overwhelming. The most important aspects of the data collection are: 1) accuracy; and 2) that it must be collected routinely on a daily basis and input into the record keeping system on at least a weekly basis. The information that must be recorded to calculate all the key performance measures includes:

- Dates, number, weight of pigs entered
- Dates and number died
- Dates, number, and weight marketed
- Dates, amount, and cost of feed delivered
- Total pharmaceutical or other expenses incurred by the group.

If the data is not entered into the record system within a week of the event occurring, the likelihood of errors occurring increases rapidly. Finding and fixing errors in the data is very hard when the memory of the event has diminished.

The other key component of data collection and retrieval is the data management system that is used. This can be as sophisticated as a web-based system with elaborate graphing capabilities or as simple as a home-made spreadsheet. The important components of the system are that it allows for easy data entry, finding errors is relatively easy, and summaries can be generated that are easily understood and contain the key performance measures. Every production system that I know prefers to summarize their data in a little different format. To truly understand the numbers, you need to have confidence that they are correct and be familiar with them, thus, consistency in reporting format is very important to improve communication. Some people can see a page full of numbers and easily understand which are important and where to focus, while others need to see it in more graphical form to find trends and problems.

There are numerous good examples that could be used to illustrate data summaries and methods of using data. Only a few will be presented here. Some of the data collected is shared as close to the end of the close out as possible (Example in Table 1). After enough data is collected, data can be graphed to clearly show the differences between barns or producers (Example in Figure 1) or compared in comprehensive tables (Example in Table 2) to enhance communication with employees in the barn or with the owners when comparing data between farms. Another very useful exercise is to determine opportunity areas where efforts should be focused, especially for producers that are part of a group that shares data with each other (Example in Figure 2). Producers often want to know how their performance or economic numbers compare to other producers. By being part of a data sharing group, these comparisons are made much more easily.

Table 1. **Example of close out data shared with the grower in one production system.**

Wean to Finish	Group 1206
Wean-finish ADG	1.76
Wean-finish ADFI	4.78
Wean-finish F/G	2.72
Wean-finish feed cost/lb gain, $	$ 0.159
Wean-finish mortality, %	6.6%
Nursery ADG	0.99
Nursery ADFI	1.51
Nursery F/G	1.52
Nursery feed cost/lb gain, $	$ 0.147
Nursery mortality, %	4.3%
Finisher ADG	2.16
Finisher ADFI	6.48
Finisher F/G	3.01
Finisher Feed cost/lb gain, $	$ 0.162
Finisher mortality, %	2.5%
Avg finisher days	104.0
Turn days for finisher	109.0
Avg market wt	295.0
Ave live price, $/cwt	50.03
Adjusted wean to finish F/G	2.49

Figure 1. **Example of an annual feed efficiency comparison for nine producers in a producer group.**

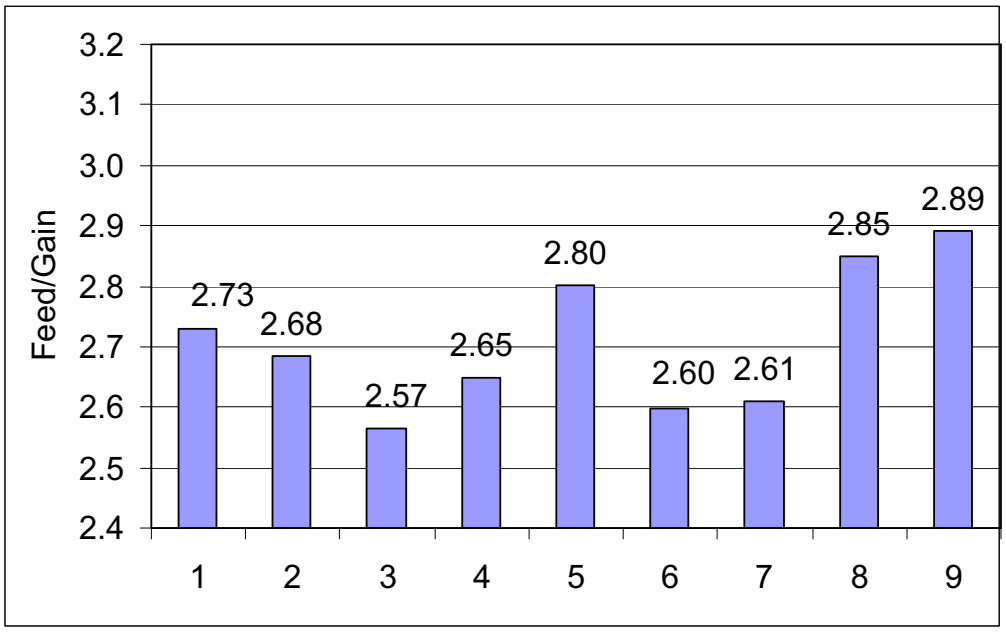
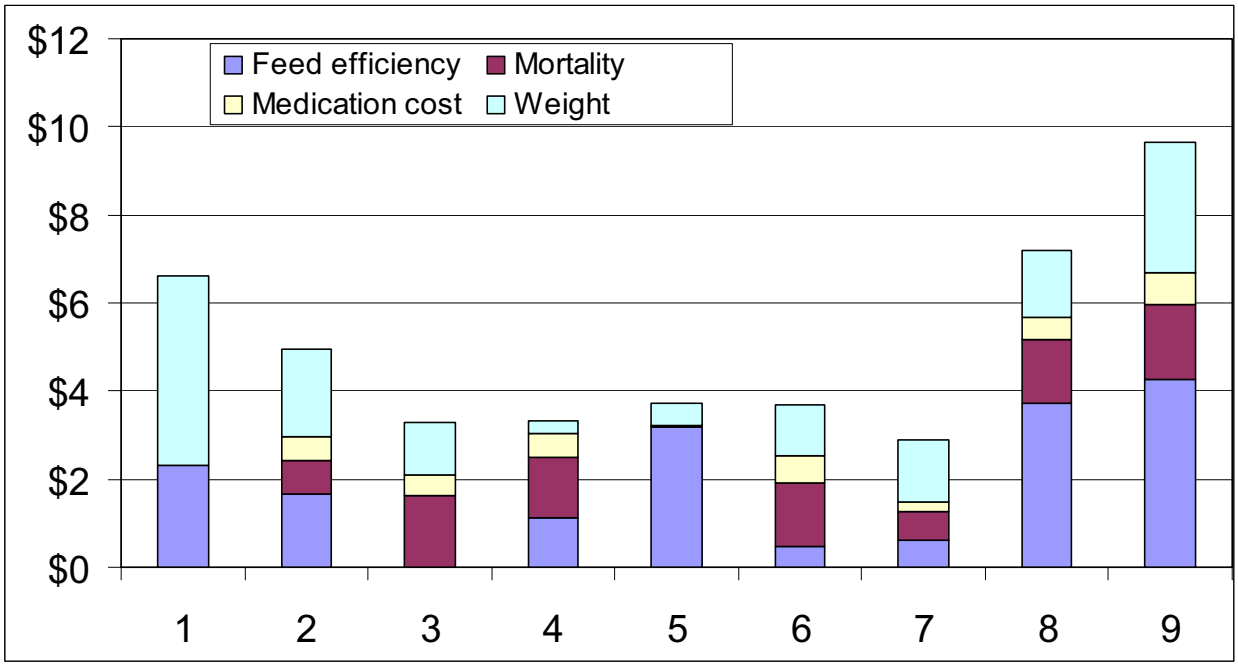


Table 2. Example of comparison of annual closeout data for five producers in a data sharing group (Performance leaders in several categories are highlighted).

	Owner				
Data	1	2	3	4	5
Average of Weight In:	60	69	58	59	67
Average of Avg. Daily Gain, lb	1.76	1.77	**1.98**	1.87	1.86
Average of Feed Efficiency	2.80	2.85	2.69	2.79	2.98
Average of Adjusted F/G	2.73	2.68	**2.57**	2.65	2.80
Average of Weight Out, lb	256	263	266	**269**	268
Average of % Mortality:	**1.88%**	2.45%	3.09%	2.88%	**1.88%**
Average of Cost / Head, $	$39.48	$40.11	$35.97	$37.48	$40.35
Average of Med Cost / Head, $	**$1.21**	$1.75	$1.68	$1.76	$1.23
Average of Feed Cost, $/lb of gain	$0.204	$0.206	$0.173	$0.180	$0.201
Average of Avg. Daily Intake, lb	4.90	4.99	5.29	5.19	5.49
Average of Avg. Days on Feed	112	110	105	113	108
Average of Turn Days	126	110	110	125	125
Average of Open Days	14	**0**	5	12	16

Figure 2. Opportunity areas ($/pig) for nine producers in one data sharing group.



Of course, when making any comparisons between producers or even between barns within the same system, care must be taken to account for differences in season, diet formulation, final market weights, placement weights, or other factors. As more data is collected, the

expected impact of each of these factors on performance can more easily be determined and used to adjust the data to a common point for comparison. Without adjustment, it is sometimes difficult to determine whether a difference in performance is real or not. For example, if feed efficiency for one group is 0.1 lower than another group, but they started 4 kg lighter and finished 5 kg lighter than another group, both groups would have almost identical feed efficiency after adjustment.

What Management Changes Should be Reconsidered on a Routine Basis?

Different management strategies may need to be considered for each group of pigs within a production system or farm because of differences in starting weight, seasonal growth rate, health status, fill time, and facility capabilities. In this section, a few of the routine considerations will be discussed.

Diet changes. Certainly as a nutritionist, I am going to list reviewing diets towards the top of items that should be considered on a routine basis. In reality, diets should be reviewed, but I don't advocate making lots of frequent diet changes unless there is a sound financial reason to make the change. Many people chase small diet cost reductions that end up causing themselves difficulty either with pigs going on and off feed because of the change in ingredients or because they can't compare their finishing groups performance to each other very well because of the differences in diets.

That being said, you do need to consider whether dietary changes will enhance profitability for each group of pigs. For example, if an increase in dietary energy will improve average daily gain, you need to include the importance of market weight in your dietary economic decision. We find that the economics of energy density changes seasonally for most production systems. Most systems are short on the space needed for pigs to achieve the optimal market weight in the summer months, but have ample time to meet market weights in the winter. Thus, diets that may increase the feed cost per pound of gain may be economical in the summer because they generate enough revenue to pay for the extra feed cost. This would rarely be the situation in the winter because there wouldn't be the additional revenue to offset the higher feed cost.

Many people think Paylean fits into the same category as dietary energy because of the impact of Paylean on growth rate. In reality, the pricing and use of Paylean has made it economical to use in almost all situations. Thus, our producers decision whether Paylean is going to be used or not is based on the relationship with their marketing partner (i.e. Does their packer pay them not to use it?), more than anything. The economic advantage to Paylean will change with the importance of ADG. If the optimal market weights are easily achieved without Paylean, the value of Paylean is much lower, but it is still profitable. If the optimal market weight cannot be easily achieved due to insufficient facility space (days on feed), the value of Paylean usually triples for most of our producers.

Feed budgets. Allocation of feed, especially the first diet, needs to be considered for each group of pigs. Because diets are targeted for specific weight ranges and the initial weight of pigs at entry will vary from group to group, the quantity of the first diet to deliver has to be

altered with each group. Because of the difficulty in communicating the correct budget for each group of pigs, the feed budgeting responsibility has been removed from the barn and placed in the feed mill for most producers. Thus, the person in the barn simply notifies the mill when feed is needed and the mill consults the feed budget to determine the appropriate diet based on prior deliveries, initial weight, and placement numbers. Some systems are sophisticated enough to adjust the feed budget for mortality; however, few systems are making this adjustment.

Medications, vaccinations, and feed-grade antibiotics. The decision on medication protocols is made on a group to group basis between the producer and veterinarian based on the current situation in the source herd, history in the facilities, economical response, and the ability to implement the program. Partial budgeting should be done when considering each intervention strategy to ensure that the proposed benefits will outweigh the treatment costs. This exercise will at least clearly illustrate the level of benefit required to pay for each intervention.

Marketing plan. Although the optimal market weight doesn't change dramatically from group to group, the marketing plan (when to make the first pull and how many pigs to pull) will often change between groups. Because growth rate is variable between groups, producers need some tools to help determine when enough pigs of the optimal market weight are available for marketing. The three main options that I see working in the field to make this determination include: 1) test weighing or using a weight tape on a sample of pigs starting at a designated time post placement; 2) using an auto-sort system; or 3) using feed delivery and an estimate of the amount of feed that should have been consumed by a certain weight. Some systems use the feed delivery and a standard growth curve with a seasonal adjustment to provide two estimates of when pigs should be nearing market weight. Then test weighing is used to more accurately estimate the actual weight in the barn. Number of pulls and number of pigs marketed at each pull is adjusted, mainly based on the amount of time remaining before the barn must be emptied.

We are often asked if there are practical means to improve, control, or monitor uniformity in pig weights. I will discuss this section in detail in my other paper in this publication. In short, once pigs are placed, the only things that can be done to improve uniformity are altering the diets or weighing pigs. Higher energy diets or higher use of Paylean can be used with the gilts to make them grow closer to the same rate as the barrows. Recently, some producers have split pigs by initial weight at entry instead of sex and fed the higher energy diets to the lightest 50% of the pigs to increase their growth rate. These techniques require the barn to have two feed lines and coordinated feed delivery, but they do work to help reduce some of the variation in final weight in the barn. Of course, the other method to improve uniformity of weights at marketing is by weighing pigs at market to ensure that pigs are marketed before they become too heavy and to prevent light pigs from being marketed too soon.

What Needs to be Done to Prepare to Receive a New Group of Pigs?

Thoroughly washed, disinfected, and dried facility. Cleaning barns is an area that has received renewed discussion in many production systems. Few argue that cleaning barns is

important to improve pig performance. However, the area of discussion is whether barns can adequately be cleaned and, especially, dried during winter months. Most swine pathogens only survive for a brief amount of time outside the host in the absence of organic material or moisture. Up to 99% of bacteria can be removed by cleaning alone under experimental conditions. The relative importance of stages of sanitation in the field include: 1) 90% of bacteria removed by removing organic matter; 2) 6 to 7% killed by disinfectants, and 3) 1 to 2% killed by fumigation. When we cannot adequately dry the facility, viruses, such as PRRS, survive for extended periods of time. When dried, they die very quickly. Because they are unable to adequately dry facilities, some production systems are experimenting with not washing finishing barns in the winter months in northern climates and doing a thorough cleaning in the summer. In this area, I would advise watching and learning from the experiences of others. I would continue washing until data indicating others have been successful with a seasonal cleaning protocol.

When washing, one of the frequent errors is not adequately cleaning feeders and waterers or not removing disinfectant from feeders or waterers. Because many feeders and waterers are not easily removed for cleaning, other methods must be used to remove water and dry them. Many producers now use leaf blowers to remove the water from feeders and waterers that are not removable.

Conduct preventative maintenance. The best time to do maintenance is when the barn is empty. Most good producers have a mental list of items that must be done between groups, but it is helpful to keep a log of items that need to be fixed, replaced, or serviced when the barns are empty. These could include items such as greasing bearings on augers or repairing waterers, gates, feeders, inlets, curtains, or insulation.

Make sure necessary supplies are on hand. Make sure any needed supplies, such as medication, syringes, needles, pig markers, or equipment parts, are on site before the pigs arrive.

Check and set ventilation system. Ventilation controllers, probes, fans, and curtains should be checked to make sure they are operational and set for the number and weight of pigs being received and the barn temperature. The barn should be warmed as possible to be in the thermo neutral zone for the weight of the pigs that are arriving.

Have feed and water available. Before pigs are placed, the proper diet for the weight of pigs being received should be placed in the feeders and all watering devices should be checked to ensure they are operating correctly and with adequate flow.

Don't sort pigs on arrival. Unless the pigs are being split to have the gilts on one feed line and barrows on another or lightest 50% o the pigs on one feed line and heaviest on another, pigs should not be sorted at entry to the barn. Pigs should be "gate cut" into pens to allow the normal variation within each pen. If they are sorted into tight weight groups within each pen, they will develop the normal variation over time to market and lower the average growth rate in the barn.

How Can the Barn Manager be Evaluated and Rewarded for Good Management?

Another question that often arises in the finishing area, centers on evaluating and rewarding the person that is in the barn providing daily care for the pig. Most contract production systems have some sort of feed efficiency bonus system where they reward managers that achieve excellent feed efficiency numbers relative to their peers within that same production system. Of course, the dietary energy level and diet form must be considered in making feed efficiency comparisons within a production system. If the production system has consistent genetics and diets, feed efficiency is one of the economically important factors that is least affected by seasonality and health status. Thus, using it as a bonus tool is not without merit. Other performance measures, such as sort loss bonuses or mortality bonuses, are used by some production systems as a means of rewarding good management. Unfortunately, much of the variability in sort loss or mortality is outside of the hands of the person in the barn. Thus, great caution should be used before implementing a bonus strategy based on these parameters. Mortality is often dictated more by the health status of pigs being delivered than management ability of the person in the barn. When selling on U.S. packer grids, the person with the lowest sort loss will have lighter market weights, excess trips to the packer, and lower facility utilization. While low sort loss may be desirable, focusing on it rather than maximum profitability will decrease net return in most situations.

To truly evaluate whether the person in the barn is doing a good job, continual routine oversight is needed. Most of our contract production systems have a field service person that visits the barn on an every week or every other week basis to monitor pig care and barn management. The factors that they check include pig treatments, feeder adjustment, barn upkeep and maintenance, temperature, ventilation, pig quality, office cleanliness, pig handling, and whether records are being maintained and turned in to the right person. The same type of system that is used for contract producers can be used with employees to monitor whether they are doing a good job.

The optimal reward system for good management depends on the person. For some, financial rewards are most important. For most people, making a difference and being important to the overall business is most important. One of the lowest cost, highest payback rewards that is often overlooked is a simple pat on back and recognition that somebody is doing a good job. Feedback needs to be timely, frequent, and meant to be meaningful to the person receiving it.

SUMMARY

Collection of key performance data allows the production system to make strategic decisions on the direction of the entire production system and for the individual group of pigs. The collection of data that is not used reduces the value of the entire data collection process in the eyes of the person in the barn. Thus, care must be taken to not collect unnecessary data. Performance results can be used to evaluate the person in the barn, but routine oversight is required to truly evaluate the quality of pig care and barn management.