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Technology is everywhere – it is an integral part of everyday life. Many people believe the agriculture industry is behind in adopting technology, but historically, producers have been early adopters of revolutionary technology from steam engines to Global Positioning Systems to genomics.

Pork production shares a number of the same characteristics as other manufacturing or integrated production operations. Yet the swine industry is far less connected in terms of sharing information with suppliers, end-users and even other internal departments, when compared to other industries, such as automotive. When you compare the automotive and swine industries side-by-side, the similarities become more obvious.

The goal of our 2012 Benchmark magazine is to show you — our readers — how important the data is that you receive from the technology you use. However, the technology itself is most important if it leads you to adjustments in your business processes and operations.

The past few years have been challenging for everyone involved in the pork industry, and we all know the future is going to bring both great opportunities and difficult times. We are hopeful that our PigCHAMP Platform and our Benchmark magazine and website will support you in your efforts to be successful – to continue to develop your systems and processes – and to improve your productivity, competitiveness, and ultimately your bottom line. We also encourage you to visit our Benchmark.Farms.com website for updates throughout the year.

A special thank you goes to all of our contributors and advisors, and, of course, special thanks to our sponsors, without whom, this publication would not be possible.

We truly hope you find this year’s magazine and the Benchmark.Farms.com website to be a useful resource.

We wish you a prosperous year!

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The three main attributes of information for the majority of executives and managers are (in order)

- Accuracy,
- Validity, and
- Level of detail.

In a way, the third attribute ‘level of detail’ is surprising, but when it is considered that the decision making process is always a risky situation where circumstances change constantly, sometimes it is better to take a quick decision based on the available information rather than wait to have all of the information we would like (an example of the constantly used term ‘fuzzy logic’).

This is certainly true in the livestock, particularly the swine industry. Many companies run their information systems on software packages (locally tailor-made products to highly acknowledged and well-known products in the marketplace) to Excel spreadsheets, or combinations of the two. Quite frequently the process is not agile, key performance indicators (KPI’s) are not set, and priorities are not defined. In other words, data (or some data) is collected, processed in the swine software package and/or Excel spreadsheets, leading to working lists and some routine summary reports being generated. Only when there is a problem is the influence of other factors checked (parity, cohort, season, facilities, etc.), either for sows or grow-finish pigs.

As the industry evolves, other KPI’s may need to be added to the list. In a general sense, only reproduction performance in sows and performance in grow-finish have been recorded. A growing need is for the collection of health data, including as it relates to other gestating (i.e. lameness problems) or lactating sows (MMA syndrome) or nursery-grow-finish pigs.

Factors contributing to this scenario include:

- Bad organization,
- Deficient information sharing processes, and
- Very restrictive security policies.

In general, big companies tend to rely on internal information, and smaller ones rely either on external or market information. Why isn’t this data used?

Another issue of growing importance is the necessity of dealing with monitoring, as opposed to analysis. In some situations this can be done in real-time management. Customers demand an immediate response to their questions and problems, and in the global market every manager knows that success is highly dependent on prompt and fast decisions. Every day more companies are moving towards real-time management with the first ones being outside our sector. The leaders in this matter are oil and gas companies, as their income and margin are highly dependent on that which is very fast changing, but their approaches can be adapted to the swine industry.

In today’s swine business, monitoring the production process is becoming extremely important, and in many cases more than the analysis of the information. The disciplined follow-up of properly defined KPIs during the production process is a valuable step leading to the early detection of risks and problems before they become worse with more serious consequences.

Monitoring weekly abortions or negative pregnancy checks, born-alive and stillborn in sows, or total deaths by category in nursery-grow-finish, can alert supervisors to early problems when deviations beyond the norm for that farm are found. For this approach statistical process control techniques are particularly useful, and we know companies are using it more and more every day – but they still need to be widely implemented.

Besides these traditional data points, there are others data points from other sectors that can be easily adapted to the swine business. As outlined earlier, a classic problem is deficient information sharing processes — those who have the data and those who need the information are not necessarily in the same place. But in today’s information age this should no longer be a problem. With a variety of communication devices real-time monitoring is now possible; data coverage is wider, more powerful, and inexpensive.

In our consultancy business we are collecting data using the above mentioned criteria using common devices such as digital pens for collecting sow and grow-finish reproduction and performance data. The data is directly uploaded into software that immediately generates quality information for our customers via the web or under customized company dashboards.

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In addition to this, we also collect physical data in real-time, effortlessly with wireless (no cabling) and at very low cost, using simple commercial SIM cards. So, room temperature, water intake, humidity and power consumption can be monitored from anywhere at any time. Linking reproduction, production, health and physical data is generating information that is of an excellent quality. Alerts based on individual preferences are easily set. The smooth integration of these different sources of data generates a new scenario for each type of producer, from small family operations to large integrations, since the cost is extremely affordable and the equipment is user-friendly and easy to use.

With this approach combined with using strong management software, an organisation’s full information potential is unleashed, instead of being underused. The consultants’ and vets’ work becomes easier and of considerably higher quality as more aspects of production can be controlled and understood.

Traditionally, the most important problems associated with moving to real-time company management have been described as the lack of technology and experience. The approach being proposed here will overcome these obstacles since data can be sent directly to the database of an organisation, focusing on our data collection efforts can successfully support those requirements. Transforming data into knowledge is becoming a must.

Finally, some practical tips that should not be forgotten when thinking about improving the use of information in your farm or company:

1. Define which KPIs are right for you; focus on getting the right information and identifying data that is unnecessary. Many companies dedicate time and resources in collecting data that will be never used. So, a good start can be to review and reconsider your data collection strategy and data usage.
2. Widen access to the information within your organization, taking reasonable precautions. The payback can be significant.
3. Promote delivery of information through devices that are part of peoples’ lives. Market share of smartphones and tablets is growing rapidly. Use them.
4. Promote education and training on how to interpret the data. Many people - from farm staff to managers - lack this basic ability.
5. Designate an information champion within your organization, and encourage their efforts. The Champion should have the responsibility of generating and delivering the information in the right format to the individuals who need it when they need it. Today’s market demands in the swine industry means greater demands are placed on us for enhanced quality and cost-effectiveness within our organization, focusing on our data collection efforts can successfully support those requirements. Transforming data into knowledge is becoming a must.

Carlos Piñeiro is the Managing Director of PigCHAMP Pro-Europa. Carlos has been with PigCHAMP Pro-Europa SL since it was founded in 2000.

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DATA VERSUS KNOWLEDGE

Many reports that are available to us provide tremendous amounts of data, but in a random unorganized fashion—which makes analysis more difficult for most of us. Despite software and hardware improvements over the years, productivity monitoring can be a bit of a nightmare when an in-depth analysis is needed. Production managers and owners rely on the numbers to indicate that they are “going in the right direction.” If the numbers change, even those who are experts may be taken by surprise. A number of years ago, Dr. Polson saw the need to motivate many of us into a better understanding on how to look at production records. This type of charting has a distinct advantage over other charting methods. With its emphasis on illustrating the variation around the mean, SPC charting has a distinct advantage over other charting methods.

The main challenge in understanding production records is separation of what has become known as “biological noise” versus a definite trend that requires energy and attention to comprehend.

Random vs. Orderly

One of the problems in our current production era, was summarized by Daniel Boorstin when he said: “Information is random and miscellaneous; but knowledge is orderly and cumulative.” In short, raw data has to be “digested” before the information becomes useful. A rare individual can look at a sheet containing numerous columns containing vast amounts of numbers and quickly analyze most of the information. The majority of us need additional help in unraveling the information so a thorough knowledge is gained to understand if the process is out of control.

“Biological Noise” vs. Real Change

While it is simple and easy to compare one number with another, such comparisons are usually limited. They are limited because of the amount of data used and needed for the comparison is relatively weak in importance. Simple comparisons are limited because the numbers are subject to biological variation that is inevitable in our current production systems. Since the two values being compared are subject to this variation, it is always difficult to determine just how much importance should be placed on what is being indicated. In other words, is the difference due to real change in your current process, or is it biological noise?

Nevertheless, site managers and production managers use the weekly and monthly reports to run the unit that they are overseeing. This can be a breeding unit, or a grow finish unit. For the purpose of this article, let us assume that the production record information is accurate. (Accuracy continues to improve as data can be input in the bar or handheld devices, etc.) There are a few constraints with each particular data system that used to be factored in if the constraints impact the accuracy of the information that was entered. Most records systems have made it simple to compile data and production parameters, so viewing the data is not a constraint.

Production records can also be used in the incorporation of partial budgeting activities, to further understand the cost of disease. This causes proper use of available tools, such as medications, vaccinations, management strategies, etc., can be utilized economically by veterinarians and producers. Production record accessibility is becoming more streamlined with the accessibility of online access. The capture of information at the farm level can be uploaded and production parameters examined within a short period of time with online access to programs.

Data versus Knowledge

Most of our modern farm production systems are subject to this variation, it is always difficult to determine just how much importance should be placed on what is being indicated. In other words, is the difference due to real change in your current process, or is it biological noise? With its emphasis on illustrating the variation around the mean, SPC charting has a distinct advantage over other charting methods.

Statistical Process Control (SPC) is an effective method of monitoring a process through the use of control charts. Control charts enable the use of objective criteria for distinguishing background biological variation from events of significance based on statistical techniques. Much of its power lies in the ability to monitor both process center, by collecting data from samples at various points within the process. Variations in the process that may affect the quality of the end product (what we are measuring) can be detected and corrected. With its emphasis on illustrating the variation around the mean, SPC charting has a distinct advantage over other charting methods.

How to Use SPC Charting

SPC charting indicates when an action should be taken in a process, but it also indicates when NO action should be taken. Chart 1 is a chart of average daily gain for a finisher unit in 2009. The mean for all the data points is 3.96 average daily gain (ADG) for this time period. This is a very good production level for an average unit, but one can quickly see that a seasonal dip in performance is documented by Rule 4. Rule 4 is a weaker signal that the “process,” in this case ADG, has been affected. Further diagnostic work or investigation is needed to better understand the risk factors involved, but nutritional quality and environmental challenges are two common ones.

Statistical process control charting has become a valuable tool for practitioners to use to illustrate when intervention is needed and justified. In addition, it takes reports that can be confusing and provides a method of illustrating production levels reached before and after implementation of a change. One of the best uses to monitor the production level after a change has been implemented to realize if the change was correct and proper (Chart 2). This type of charting has been valuable to illustrate to owners and production staff that their unit is progressing or reaching their farm’s goals.

REFERENCES


Dr. Tom Gillespie is the owner and founder of Rensselaer Swine Services. He graduated from Purdue University with a DVM degree in 1979 and initially entered into a mixed animal practice in Illinois before moving to a mixed animal practice in Rensselaer in 1986. After several years of focusing on swine production medicine, he started Rensselaer Swine Services, P.C., in 1991.
Pork Production Trends
Summary of the 2011 Data

Using Data to Make Future Improvements to Enhance Profitability
By Susan Olson, Knowledge Center Manager, PigCHAMP

Besides the immediate benefit to PigCHAMP customers, our international benchmarking comparisons provide industry influencers with a bird’s eye view of key production indicators, helping them track pork production trends.

2011 brought another year of improved productivity and a continued wide range of performance across farms. This database takes the reports of our record keeping system and summarizes the results to allow benchmarking and characterization of the industry as a whole. Our endeavor is to allow producers to identify methods for potential improvement and allow allied industries to identify opportunities as well.

We understand it is difficult to define a “typical” sow herd. Size differs. Ownership differs. Herd objectives differ. Some are contracted to sell weaned piglets while others produce piglets to be finished within their own facilities or flow into a multi-sourced system. Many are commercial herds; others are in the business of genetic multiplication. Owners differ. Herd objectives differ. Some have experienced significant disease challenges; others are relatively healthy.

Recognizing these challenges, is why PigCHAMP will be introducing The PigCHAMP Knowledge Center. Our Knowledge Center will be a web-based treasure chest of information for swine industry professionals. Members will have the ability to compare key performance attributes for their operations against a database of operations from around the world. The Knowledge Center will take “Benchmarking” to new levels of sophistication allowing users to compare key attributes of performance against a global average, by operation size, geography or against farms in their own organization.

Although the content of the quarterly and year-end benchmarks may be limited at this point, they provide relevant information. Current benchmarks serve to set expectations. As with other technologies, the value of the benchmarks lies with the implementation of benchmarking and the steps taken toward herd improvement as a result of the findings.

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Thus, we believe it is important to consider all opportunities as well.

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Over the years, we have published a number of annual issues of Benchmark Magazine. While the Summary of the previous year’s data is always a timely report in the Magazine, many of the other articles in each issue, may still be informative to our readers. The past five issues of the magazine are available online at:

- June-July 2011
- April 2011
- May-June 2011
- March-April 2011
- February-March 2011

To access these issues, visit Benchmark.Farms.com.
When We Benchmark, Do We Really Understand the Numbers?

Understanding Your Starting Point for Future Improvements
By David Nolan, DVM, Senior Operations Manager for Cargill Pork

The term benchmark was originally used by surveyors to refer to points with known elevation and geographic position. All land survey measurements were required to be referenced to the known benchmarks to be legally binding; after all, what good is a set of measures and vectors if you don’t have a known starting point. The benchmark seems rather ancient when we consider the technology we have at our fingertips today with global positioning systems but alas, even the GPS systems use benchmarks on earth to function properly. In many cases our farm production measures are much like a survey with no benchmark or known starting point.

As we benchmark our production we must strive to fully implement the premise of the benchmark by understanding the starting point for the numbers. A benchmark without the finer details is an exercise in futility.

A benchmark without the finer details is an exercise in futility.

Before I review an actual case study I need to ask how much training is done with the people actually recording the numbers in the barn? Even if you answered any number above zero, have you verified that it is occurring in the manner you trained? We assume the numbers that show up on the computer screen or printed report are accurate because they are calculated by the computer using mathematical equations and highly sophisticated programming, but we all have heard the adage: garbage in – garbage out, and it is true! At a bare minimum staff training is required, and indeed is very important — managers must have an understanding of the people doing the daily recording of information. We place a tremendous amount of trust in our valued employees, as we should, but at times the employee’s daily tasks get clouded by other priorities and signals we are sending.

The case of the missing born-live: A pod of farms was struggling with born-live numbers. Further analysis showed that not only was the born-live low, but total born was also suffering. After in-depth analysis of the PigCHAMP reports, and comparing the pod of farms against another series of farms with similar genetics in the same production system, production managers jumped to the conclusion that the semen was to blame. The proverbial rabbit was let out of the cage and the chase was on. Since the boar studs for the two farms were different this was the obvious smoking gun. The boar stud was replaced with the same stud that produced semen for the better producing farms. The only problem is that after 6 months on the same stud as the better farms, the born-live still didn’t improve. After another round of “in-depth” analysis, it was determined that semen was still to blame but this time it was because the method of delivery was different. The switch was made from over-night delivery to air transport with a dedicated courier. As you may have already guessed, 6 months passed and born-live didn’t improve. Was it time for another trip to the farms, only this time with a new focus.

The farms with the low born-live were paid for total pigs shipped; however, they had an employee incentive program for the farrowing house workers that was tied to pre-weaning mortality. Apparently, it wouldn’t be “fair” to have an incentive program based on total pigs shipped when farrowing employees had no direct impact on quality of matings or farrowing rate.

It would seem that there is no number much more important to the weaned pig producer than born-live. A pig cannot be weaned if it is not both born and living. Never does a visit to a sow farm go by without some mention of born-live or genetics sales presentation, without the latest and greatest breed combination trotting a stellar born-live number. It always amazes me how every breed beats every other competitor. How is it possible to have every genetic line ranked number one?

Before I review an actual case study I need to ask how much training is done with the people actually recording the numbers in the barn? Even if you answered any number above zero, have you verified that it is occurring in the manner you trained? We assume the numbers that show up on the computer screen or printed report are accurate because they are calculated by the computer using mathematical equations and highly sophisticated programming, but we all have heard the adage: garbage in – garbage out, and it is true! At a bare minimum staff training is required, and indeed is very important — managers must have an understanding of the people doing the daily recording of information. We place a tremendous amount of trust in our valued employees, as we should, but at times the employee’s daily tasks get clouded by other priorities and signals we are sending.

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So did the workers in farrowing departments lie about born-live? Although there was incentive to cloud the numbers born, and this may have been done in some cases, for many of the employees it would be more accurate to say they were “cautious” about how they reported the results, so that they did no harm to their team’s performance...or their paycheck. The team had been trained that if a pig is dead and is immediately behind the sow then it must have been a stillborn so it was recorded as such.

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Nothing is more clear than pigs weaned right? Either the pig is there or not. Do you reconcile pigs wounded on the sow farm with good pigs that arrive in the nursery? If a weaned pig producer is loading the truck and there is a discrepancy on pig count I am sure the error will trend towards the higher number rather than the lesser, and when the nursery producer receives those same pigs the count will tend towards a more “conservative” number of head received. And then there is the issue of good pigs vs. total pigs and does this number include DOAs which aren’t anyone’s “fault” except transportation. As a general rule the sow farms will ship more pigs than the nursery producer wishes to receive. Are these marginal pigs captured in the benchmark number and used with pride as the sow team touts an amazing PSY number? So can we really trust that 30 PSY number and does it send us on another rabbit hunt that more closely resembles a snipe hunting you might have done on a high school camping trip?

I trust you are beginning to see the problems created by sub-optimization — or the approach that each department drives to optimize their own area of influence. We often see unintended consequences when one area of the business strives for perfection while ignoring or not understanding the bigger picture.

Although I used the farrowing house to demonstrate this phenomenon there are many more examples. The formulator aims for the lowest cost per ton, while the merchant tries to minimize the incoming cost of those ingredients, often by-passing concern for variation or nutrient content of those ingredients because that information either is not measured or much more difficult to obtain at the speed of commerce. The finishing team measures mortality and feed conversion, but if there is a feed issue it is the till or nutritionists that must have done something wrong, not the farm, and the same team will lobby to exclude certain closouts from reports because there was a ventilation failure resulting in extreme mortality that was out of their control.

Let’s look at a simple calculation of gain. Is gain calculated by one of these equations: (1) total pounds live weight shipped – pounds of live weight received, or (2) (average weight shipped – average weight received) X head shipped. Those two calculations give completely different answers and both could be correct depending on your system and ability to collect numbers. The second calculation hide the impact of mortality, while the first is said to adjust for its impact. Without the whole story and an understanding of the results, they could lead you on one of those rabbit chases that adds no value.

Are you benchmarking against one of those “adjusted” benchmarks or one with known coordinates? Do you have access to the whole story? The only way to know is to dig deep into the numbers and make sure the service you use, allows you to do the digging and has the standards established up front to minimize the unintended consequences. And don’t hesitate to ask how the number you are focused on could be massaged to reveal a sub-optimized result as you can use the numbers to optimize your entire operation not just a department.
ARE LOWER CORN PRICES AND HIGHER HOG PRICES IN THE NEAR FUTURE?

By Moe Agostino, HBA, DMS, FCMI, Managing Commodity Strategist, Farms.com Risk Management

In 2011, by early April, CME Lean Hog futures had already achieved an intraday record high for the June futures contract at US $104.10/cwt, only to retest the high at $104.35 by May 2011. The contract eventually moved lower by $12.50/cwt to go off the board at $91.85/cwt. The only futures contract that achieved an even greater high was the 2011 August futures contract, which expired at a new all-time record of US $107.45/cwt. In the first quarter of 2012, CME Lean Hog futures began trading at very lofty levels, but have since slumped as the US pork carcass cutout value — a measure of domestic demand and movement of pork supply — has slipped, now down to US $79.35/cwt compared to last year at US $94.28/cwt.

IS IT SUPPLY OR DEMAND?

IT’S BOTH.

A combination of higher feed prices, record retail prices, higher retail gasoline prices, more pork in cold storage, negative packer margins, and about 2% - 5% more pork supply — due to continued productivity efficiencies and higher hog weights because of milder winter — resulted in a recipe for lower hog prices. In fact, at the start of 2012, managed money were adding to their futures contracts and were bullish about the future.

They have since been sellers and are now net short hog future contracts while corn prices have been relatively flat. This has caused the hog-corn ratio to fall to 10.1 for March. With the exception of the disastrous months between January 2008 and January 2009, when the average ratio was below 10, this is the lowest reading since 1998. The old rule of thumb is that a ratio above 18 or 20 means hog expansion and vice versa. A ratio of 10 or lower simply means herd liquidation or no expansion and the possibility of lower corn prices and higher hog prices in the future.

ARE HOG FUTURES HERE TO STAY?

They have since been sellers and are now net short hog future contracts while corn prices have been relatively flat. This has caused the hog-corn ratio to fall to 10.1 for March. With the exception of the disastrous months between January 2008 and January 2009, when the average ratio was below 10, this is the lowest reading since 1998. The old rule of thumb is that a ratio above 18 or 20 means hog expansion and vice versa. A ratio of 10 or lower simply means herd liquidation or no expansion and the possibility of lower corn prices and higher hog prices in the future.

Seasonally, the hog market can muddle along until Easter, but shortly thereafter the buying for the summer grilling season kicks in and it could be enough to get futures back to the highs of 2012 around US $100/cwt — but will it be enough?

ASIAN DEMAND KEY!

The strong pork export demand driven by Asia produced a record 2011, up 25% vs. 2010, has so far continued in 2012. However, some experts are worried that since we are at such lofty levels, this too will start to disappoint in the coming months of 2012. However, this is still only 25% of the pie, while domestic demand continues to represent a very large 75% and is just as, and even more important, for prices short-term.

LOWER FEED PRICES POSSIBLE

The 2012 March USDA Prospective Plantings report projected that US farmers intend to plant 95.9 million acres of corn this year, the highest level in 75 years. There are still many hurdles to jump over to get such a large crop in the bin, but if yields line up as projected, grains costs should decline this fall, and, of course, hog prices will go down in sympathy.

Bottom Line

If domestic and export demand do not remain strong, with supplies about 2% - 3% more than last year, and if feed prices eventually do fall, high hog prices will be tough to come by. But this game is not over yet! A patient hog producer should still be able to lock in margins and profits in the next 3-4 months of the fall/winter of 2012 and 2013, before expansion in the industry and lower feed prices take the hog industry by surprise. Look for a second summer rally in August 2012.

Moe Agostino is a Managing Commodity Strategist for Farms.com Risk Management. For more information on our recommendations and how to manage price risk in your crop and/or livestock operation, contact Moe at Moe.Agostino@Farms.com or go to www.RiskManagement.Farms.com
Simple Math Can Miss Opportunities

Determining Factors to Consider When Looking at Truck Drivers and Dead on Arrival (DOAs)

By Stephanie Rutter-Ramos, DVM, Independent Consultant

For the many farms that finish pigs, the return for all their efforts is not realizable until the pig walks into the slaughter plant. Since we have come to recognize the role that people have in the success of pig production, it seems only natural to ask about the association between truck drivers and dead on arrival (DOAs) at the plant. However, when working in a biological system, few relationships are as simple as they may seem.

Much of the value of detailed analysis comes in learning the aspects of a system that drive outcomes independent of the people in the barns. Pig populations are dynamic. The parity distribution of the sow base for any group of nursery and finisher pigs is variable. So, too, is the in-barn mortality rate ranked. Group mortality rate was evaluated as a risk factor for DOAs if it fell in the system’s top third (>3.5%). Truck loads came from either a single finisher group or more than one (split load). Ship date was assigned to quarter of the year [1, 2, 3, or 4] and being occurring in June–August [summer]. Since truck drivers were the primary variable of interest, only those with 10 or more loads were included. Sixteen truckers were represented. All pigs were hauled to the same packer. More than 180,000 pigs and 1,300 shipped ticket events were represented in the data set.

Consider the following system. In an effort to reduce DOAs at the slaughter plant, they would like to identify and eliminate the services of the driver(s) with the highest rates of DOAs. The logic is fair, but may be too simple. What if there are some factors or circumstances that predispose certain loads to DOAs? In other words, if you put a competent driver into a bad situation, is it reasonable to expect average or above average results?

Of the data that we routinely track, what factors could be associated with DOAs? Is it possible that the health challenges pigs experience across their life affect their ability to handle the stress of transport to market? Does the frequency of DOAs change across seasons? And in the absence of measuring trailer loading times, is there a proxy variable that can describe how long pigs are waiting before the vehicle starts moving?

The following data analysis looks at the associations between DOAs, truck drivers and other known factors from one year’s worth of data in a given system. The system was comprised of several sow farms, with pigs derived from six different nursery sites. Finisher groups came from twenty-five different sites and were able to be linked to nursery sites, but not nursery group. Finisher groups were either single or mixed sex. For each finisher group represented, in-barn mortality rate was ranked. Group mortality rate was evaluated as a risk factor for DOAs if it fell in the system’s top third (>3.5%). Truck loads came from either a single finisher group or more than one (split load). Ship date was assigned to quarter of the year [1, 2, 3, or 4] and being occurring in June–August [summer]. Since truck drivers were the primary variable of interest, only those with 10 or more loads were included. Sixteen truckers were represented. All pigs were hauled to the same packer. More than 180,000 pigs and 1,300 shipped ticket events were represented in the data set.

When working in a biological system, few relationships are as simple as they may seem.

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1 Haiwick, G. et al. Trivalent vaccine mixture protects against simultaneous challenge with PCV2, M. hyopneumoniae, and PRRS virus. Accepted Leman Swine Conference 2010.


3 Haiwick, G. et al. Trivalent vaccine mixture protects against simultaneous challenge with PCV2, M. hyopneumoniae, and PRRS virus. Accepted Leman Swine Conference 2010.

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SIMPLE MATH CAN MISS OPPORTUNITIES

besides the using the odds ratio as a tool to evaluate associations between risk factors and the occurrence of DOAs events, we can also use analysis of variance to estimate the long-run expectation for DOAs given a particular group attribute or driver. The merits of using a more formal analysis instead of simply crunching numbers hinge on the ability to simultaneously account for sample size and variation (repeatability) and multiple sources of variation. In other words, one had hard by an otherwise good driver will not a bad record make. Just as importantly, however, we can estimate the effects of different factors on the rate of DOAs.

In this analysis, we are able to account for nearly 25% of the variation in DOA per thousand head shipped with variables describing if the load was from more than one barn (split load), if source group mortality ranked in the system's top third, if finisher groups originated from a specific nursery, and the truck driver, including the driver's performance within particular finishing sites.

Adjusting for the known sources of variation in the dataset, we would estimate that split loads average 1.03 (SE=0.25) fewer DOAs per thousand shipped than un-split loads. Groups with the highest third of in-barn mortality average 0.89 (SE=0.3) fewer DOAs per thousand shipped than those with mortality in the lower two thirds. Pigs derived from one nursery were estimated to experience 3.5 (SE=1.4) more DOAs per thousand shipped than from all other nursery sources. As well, three truck drivers stood out as having a predictably higher rate of DOAs compared to the rest of the drivers, with rates of 8.6 (SE=5.3), 5.1 (SE=0.9), and 5.0 (SE=1.0) DOAs per thousand shipped.

While a simple evaluation of DOAs likely would have identified the same drivers as having extraordinarily high rates of DOAs, it must likely would have missed identifying those other areas for system or site-level interventions. Sadly, when those factors bigger than the individual person are overlooked, any opportunity for system-level improvement is lost.

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HEALTHY ANIMALS. HEALTHY FOOD. HEALTHY WORLD.

Dr. Stephanie Rutt-Ramos received her DVM and PhD from the University of Minnesota and is an independent consultant. To contact her, email rutt0011@umn.edu.
The purpose of this paper is to discuss some of the critical control points during early lactation that need to be considered by a production unit, to maximize the number of good, healthy piglets weaned.

**THE SOW**

How a sow is fed during gestation can affect her milk production. A sow entering farrowing in a negative energy balance has the potential to be one of those sows who has her pigs and then does not eat much after farrowing, subsequently drying up. The last trimester of gestation is not the time to correct body condition on over-conditioned bred sows, and restricting their feed during this period can set them up for failure during lactation. Body condition on all nursing sows needs to be monitored weekly and any major feed adjustments made on specific sow needs to be made in the first or second trimester of gestation. Also, make sure each sow in lactation gets up every day and is eating. Remember she is the milking machine for her piglets, and their nutrition and survival is dependent on her eating and lactating optimally.

**COLOSTRUM**

Every piglet needs to receive a good dose of colostrum within 24 hours of birth, preferably from its birth dam. Not getting colostrum before gut closure is a death sentence for the piglet. Some of the pre-weaning mortality seen in swine operations may be due to piglets in large litters being pushed off of teats while the colostrum is flowing, such that they receive suboptimal levels of colostrum. Split suckling is a procedure that can be used to help ensure the majority of piglets in large litters receive suboptimal levels of colostrum. It entails taking half the litter and putting it in a “hot box” under a heat lamp while the other half of the litter nurses. After 1-2 h, the two groups of piglets are switched. Both groups of piglets have reduced competition for teats and a better chance of getting a good suckle during the initial lactations when colostrum is flowing. Also, colostrum is not just about antibodies. It also contains a number of growth factors (EGF, Insulin, IGF-1, IGF-2 and TGF-Beta, for example) that help develop the piglet in its first few days of life. How piglets get started in life can affect their immediate survival, but it can also affect subsequent performance in the nursery and finishing. Managers sometimes say they can’t afford the time and/or labor to implement this type of procedure in farrowing. The question should be “Can they afford not to implement such procedures?” given the large litter sizes we now have being born in the US.

**VIGOR OF PIGLETS**

Vigorous, healthy piglets should be the candidates to cross-foster. Being moved from the birth environment is stressful on a piglet. Research at The Ohio State University has showed, when above average pigs, relative to vigor, were cross-fostered, they had better livability and heavier weaning weights than non-cross-fostered piglets.

**LIGHT WEIGHT PIGLETS AT BIRTH**

Piglets having birth weights below 2 lbs. have a much greater risk of not surviving to weaning, or dying in the nursery, compared to piglets born with heavier weights. The graph below suggests a 2 lb piglet at birth has a 50/50 chance of surviving to weaning -- dropping off dramatically with piglets who weigh less. When considering Cross-fostering, managers need to consider if those small piglets will survive, or if they will take up resources in extra care and space in the farrowing crate that will result in no piglet produced at weaning. Whether these small piglets should be allocated the sow’s resources or whether they should be humanely euthanized needs to be determined at each farrowing.

**TIMING OF CROSS-FOSTERING**

The majority of Cross-fostering should be done within the first 1-3 days of life for the piglet. Some Cross-fostering may be needed in the middle of lactation if it’s a sow’sudder dries up, but this should be the exception, not the rule. Some production units will continually cross-foster during lactation, moving piglets around, thinking they are improving chances for piglet survival and weaning weights. However, each farrowing crate needs to be seen as a micro environment, within the larger farrowing room environment and sow farm. Each movement affects that micro environment and piglet growth within that environment. Work at Michigan State University has demonstrated that restricting Cross-fostering to the first two days of life improves weaning weight by 20% compared to a system where Cross-fostering occurs throughout lactation. If the goal is to raise more good quality pigs, it seems prudent to try and do all Cross-fostering within 1-3 days of birth.

**NUMBER OF PIGLETS/SOW**

Some units strive to even out all litters within a group to a single number nursing per litter, 12 pigs per litter, for example. The hope is to have more uniform piglets at weaning. While this might be a workable protocol in large units with minimal staff, as stated above, each farrowing crate is a micro environment and movement of a piglet to another litter/environment can be a stressful event impacting piglet growth rate. If a sow has 15-16 functional nipples and 12-14 piglets, leaving the piglets where they are may be the optimal solution. Implementing one rule for micro environments across a production unit might be less optimal than doing Cross-fostering on a sow by sow basis.

**OPTIMIZE EARLY PIGLET CARE TO MAXIMIZE PERFORMANCE**

By Thomas Long, Ph.D., Quality Control Manager, Norsvin USA

Over the past few decades the US swine industry has made quantum leaps in the prolificacy of its sows. In the past, when people talked of production levels of 30 pigs/sow/year, they were considered “dreamers”. Today some top managed sow farms are achieving this level of production, and many more are pushing hard on this milestone. To achieve these levels of production the goal must be to wean as many good, healthy pigs as is possible, and a number of farrowing facilities have implemented a variety of Cross-fostering strategies in an attempt to achieve this goal. Although well intentioned, many of these strategies are counter-productive to this goal, and some management groups have implemented rules of no Cross-fostering within their farrowing facilities as a method to control over-Cross-fostering. However, there may be times when Cross-fostering may be needed. Examples of when it is needed include:

1. Breeding department overused for farrowing spaces available
2. The conception rate on a group was better than planned for
3. A sow dies during the birth process, but did produce some live pigs
4. A sow stops milking (agelactia) early in lactation and no artificial rearing options are available
5. There are a number of large litters born of good healthy sows on sows with poor underlines such that these sows will not support these litters through lactation, but NOT just to “even out” litters

This research also showed that when average vigor pigs were cross-fostered they had poorer livability and lower weaning weights than non-cross-fostered piglets. These results suggest that when selecting cross-foster candidates from large litters, strong, healthy piglets should be chosen. This should optimize performance in both the piglets that were crossfostered, as well as the piglets that remained with their birth dams.

**PRE-WEANING AND NURSERY SURVIVAL**

The below figures illustrate the importance of actions occurring prior to and during farrowing and lactation that can impact the piglets’ ability to survive and thrive. Poor feeding of the sow prior to farrowing prepares her for success during lactation. Actions during the first 1-3 days of life for piglets can affect their ability to survive until weaning, and their subsequent performance in the nursery and finishing departments. Each management group should review their current practices in each of the below mentioned areas to optimize how they implement early piglet care to maximize performance in piglets born within their production units.

Dr. Tom Long has more than 30 years of experience in swine genetic improvement programs and their implementation into production systems. After receiving his PhD from the University of Nebraska, he worked for 5 years in Australia with swine genetic improvement software for the Australian swine industry. He then spent 5 years on the University of Nebraska faculty in a Research and Extension position followed by 8.5 years with Smithfield Premium Genetics as a Geneticist and Genetics System Manager. He is currently the Quality Control Manager for Norsvin USA.
How to Achieve Less Than 3% Wean to Finish Mortality

KEY DRIVERS TO BENCHMARK WHEN A GROUP IS ON ITS WAY TO A STRONG FINISH

By Kelly Greiner, DVM
Carthage Veterinary Service, Ltd.

Most organizations have a laundry list of how to achieve wean to finish mortality of less than 3%; but only in the last few years have I drilled down further to look at other factors that can be controlled to achieve that benchmark in wean to finish. The key to achieving less than three percent mortality in wean to finish is focused on three things:

1. Excellent health
2. Correct environment
3. Monitoring growth

Besides excellent health of the weaned pig which is the most important criteria to achieving 3% or less mortality, correct ventilation is also a key component.

One thing I have started doing with my clients is benchmarking LP usage against other producers in our system. Based on their geographical location, I have a benchmark number for that producer. In our area, I target no more than 1.5 gallons of LP use, per space, per year to wean to finish, and no more than 0.5 gallons per finishing space per year. We track heater run times, and, based on that, we adjust minimum ventilation while balancing relative humidity in the barn.

My target for temperature difference between high and low is less than 3 degrees in a 24-hour period during mild and cold months of the year. We track heater run times, and, based on that, we adjust minimum ventilation while balancing relative humidity in the barn.

An average weight is important to know in order to budget feed, and set ventilation. It is just as important to know the distribution of piglet weights. Because we're dealing with biological production, we cannot turn out 2,400 widgets of the same size from the sow farm every week. Distribution is important because we now have a larger weight difference between the smallest and largest pigs in a group. Increased laktation length in years have given wean to finish managers the opportunity to use that variation to their advantage by feeding the smaller pigs differently than the larger pigs. In a normal distribution, we know that one third of pigs fall between the mean and one standard deviation (SD) above the mean. Another one third of the pigs are between one and two SD above the mean, and the last third are three SD above the mean. Using this information, we are able to predict how many pigs should be a certain weight at the end of the growout.

Another benchmark number to review to determine if a group is started well is weight at three weeks placed. A healthy group of pigs should at least double their weight in those three weeks. So, if they average 12 pounds at weaning, they should be at least 24 pounds three weeks placed. Based on a normal distribution of pigs in a barn, we should be able to accurately calculate the average weight in the barn by following the top three percent of pigs in the barn near the end of the turn. A group of pigs averaging 12 pounds at placement should have the top 2.5% of pigs weighing on average 19 to 20 pounds. So, by 6 weeks placed, they should double their weight again. That same two and a half percent of pigs should weigh 80 pounds at 6 weeks placed.

Another benchmark number to review to determine if a group is started well is weight at three weeks placed. A healthy group of pigs should at least double their weight in those three weeks. So, if they average 12 pounds at weaning, they should be at least 24 pounds three weeks placed. Based on a normal distribution of pigs in a barn, we should be able to accurately calculate the average weight in the barn by following the top three percent of pigs in the barn near the end of the turn. A group of pigs averaging 12 pounds at placement should have the top 2.5% of pigs weighing on average 19 to 20 pounds. So, by 6 weeks placed, they should double their weight again. That same two and a half percent of pigs should weigh 80 pounds at 6 weeks placed.

So in summary, we know the key to achieving less than three percent mortality in wean to finish is focused on three things. First, health is king. We have to have pigs placed that are PRRS negative, and preferably mycoplasma pneumonia negative to have a chance of reducing mortality. Second, we have to have diligence and continual monitoring to make adjustments are necessary to homogenize the room environment and subsequently negative to have a chance of reducing mortality. Third, feed is critical. We need to get our animals started, setting up the correct environment on day one, and subsequently make adjustments are necessary to homogenize the room environment and thereby reduce mortality and feed costs. And finally, monitoring the growth of the group of pigs at both 3 and 6 weeks placed will indicate if we are driving those pigs to maximize daily feed intake.

In conclusion, understanding that a group of pigs have a distribution of weights, and managing the distribution will allow you to capture more dollars at marketing by getting a higher percentage of pigs in the optimum weight range.

The key is to understand the distribution of weights in the new group of pigs and manage those groups accordingly.

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WHY PERFORMANCE EVALUATIONS ARE IMPORTANT
Performance evaluations allow senior leadership and managers to identify the actual mechanism for planning, monitoring, and evaluating employee performance and development. This also ensures that job expectations and goals are focused and directly aligned with the organization’s goals.

Communication is key, and employees want their managers to communicate how they are doing and they want to hear it from their managers. They want feedback on how to improve and to be recognized and appreciated. Quite possibly the most important factor, employees want to know how they are doing and they want to hear it from their managers. They want feedback on how to improve and to be recognized and appreciated for the things that they’ve done well.

In a recent AgCareers.com webinar, guest presenter Dr. Sara Mann of the University of Guelph, also shared that while it is hard to estimate the ROI for effective performance management, research shows that it leads to higher levels of employee motivation, job performance and commitment, and lowers the level of costly turnover.

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The definition of employee performance management includes planning work and setting expectations for team members and continually monitoring performance.

The definition of employee performance management includes planning work and setting expectations for team members and continually monitoring performance. It is also important to benchmark performance and in most definitions it is strongly recommended to reward good or solid performance.

There are a number of performance review tools and documentation available to choose from. It is important to use a standard tool/document so that there is consistency in the process. This will help alleviate bias and create a sense of fairness among employees. Select a tool that is functional, applicable, fair, and encompassing of the benchmarks you’d like to evaluate.

Preparation is an important step that needs attention. This step sets the stage for a productive discussion with the employee. Complete the assessment documentation noting specific examples for both positive performance and areas of improvement. Keep in mind that there should be no surprises during the evaluation process. Effective managers provide performance counseling throughout the year. The formal evaluation is to review those identified areas for improvement, assess progress, and discuss next steps. Ask the employee to submit a self-assessment in advance of the meeting. This will allow for sharing during the meeting and a more open dialogue.

During the performance evaluation discussion, the focus should be on two-way dialogue. Allow the employee to share their thoughts and self-assessment. Be sure to listen and acknowledge those areas of consensus. You will also want to highlight where you have a differing perspective. Allow for questions and again, try to provide specific examples to support your comments.

...continued on page 28
BENCHMARKING EMPLOYEE PERFORMANCE  (continued from page 26)

To wrap up the discussion, review the key points, discuss any further concerns, and talk about next steps. It can also be beneficial to ask for feedback on your management style. If you do this, be sure to listen attentively and do not become defensive. It is also very important to implement as much of the feedback as possible.

Benchmarking employee performance can be in the form of ratings. A standard rating system, such as a metric system (1 through 5 scale), is needed. Be sure that team members understand the scale and have descriptions for ratings. For example, a 3 is a solid performer – performance consistently met expectations in all essential areas of responsibility. These ratings give the employee something tangible to reflect on, and also assist with streamlining the reward process. Bonus tip: If you have multiple people evaluating employees within your operation, have the evaluators briefly connect before assigning ratings to calibrate or check that there is a consistent level of performance by employees from one department to another.

Many organizations use a pay for performance strategy and link performance ratings to merit or base pay increases. To do so, compile salary recommendations, for assistance with this consider AgCareers.com’s Compensation Benchmark Review, an agribusiness salary survey. The structured rating system will assist managers in communicating performance-based increases and again provide a consistency across the organization that conveys fairness to staff.

While there are critical production measurements needed, it is just as critical to measure employee performance. By standardizing and providing a systematic approach to performance management, operations can enhance their employee retention, employee morale, profitability and overall production. For more information on employee performance management, email AgCareers.com at agcareers@agcareers.com.

To further explore this concept, you may also be interested in reading the article Simple Math Can Miss Opportunities on page 18.

Erika Osmundson is the Marketing and Communications Manager for AgCareers.com, the leading online job board and human resources service provider for agriculture. For more information on how to Benchmarking Employee Performance, visit AgCareers.com.
The pigs weaned per lifetime within the industry, is lower than the scientific community would suggest is possible and optimal. Pigs weaned per lifetime decreased from 2003–2008 (Table 1). However, in 2009–2010 there was a large improvement in the pigs weaned per lifetime.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>AVERAGE PIGS WEANED PER LIFETIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001 - 2002</td>
<td>42</td>
</tr>
<tr>
<td>2003 - 2004</td>
<td>31</td>
</tr>
<tr>
<td>2005 - 2006</td>
<td>32</td>
</tr>
<tr>
<td>2007 - 2008</td>
<td>30</td>
</tr>
<tr>
<td>2009 - 2010</td>
<td>38</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>34</td>
</tr>
</tbody>
</table>

(Table 2) shows the average age at culling and the average cycle at culling. The closer the parity and cycle numbers are to each other the less returns to estrus as rebred events have occurred with the population that was removed.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>AVERAGE PARITY</th>
<th>AVERAGE CYCLE</th>
<th>DIFFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001 - 2002</td>
<td>3.5</td>
<td>3.9</td>
<td>(+.4)</td>
</tr>
<tr>
<td>2003 - 2004</td>
<td>3.5</td>
<td>3.9</td>
<td>(+.4)</td>
</tr>
<tr>
<td>2005 - 2006</td>
<td>3.5</td>
<td>3.9</td>
<td>(+.4)</td>
</tr>
<tr>
<td>2007 - 2008</td>
<td>3.2</td>
<td>3.6</td>
<td>(+.4)</td>
</tr>
<tr>
<td>2009 - 2010</td>
<td>3.9</td>
<td>4.2</td>
<td>(+.3)</td>
</tr>
</tbody>
</table>

This data set shows that on average sows are culled without producing 40 pigs per lifetime, at an average parity of 3.5. (Graph 2) Hoge reminds us that pigs weaned per lifetime is now recognized as both an economic and a welfare concern to our industry. Welfare as expressed by death rate, or average age at sale is a measurable outcome that may be used to evaluate how the industry is performing in the future.

TO IMPROVE ON LIFETIME PERFORMANCE WE MUST FOCUS ON ALL ASPECTS TO HELP IMPROVE THE LONGEVITY OF OUR HERDS.

By Sasha Gibson, Fairmont Veterinary Clinic & Jayne Jackson, PigCHAMP

The length of adult sow life (longevity) is now recognized as both an economic and a welfare concern to our industry.

Sow longevity is often discussed with relation to gilt development and retention. Foxcroft stated that gilt entry was one of the most critical factors driving sow longevity. (Foxcroft et al., 2006). Over the last six years there has been more emphasis on gilt development, with the implementation of buildings specifically for the growing gilt, diets formulated for lifetime performance and labor trained to specifically work with the gilts.

Sow longevity can be defined several ways; (Knauer et al., 2010) used the stay ability to parity, (STAY4); others have used parity at removal, days in the herd at removal and lifetime pigs weaned. (Patternon et al., 2012).

In a data set sourced from PigCHAMP Knowledge Center Database, removal records were reviewed to identify what if any changes have occurred to sow longevity and productivity since 2001. When we consider female loss as key factor on the effects of sow longevity; we know that different sow herds at different sow size and genetics can be compared; this makes the sow loss analysis a highly comparable result to use within our industry as a benchmark.

Using a dataset that represented 1,833,771 removed females/sows over a 10 year period of time we analyzed key industry factors such as parity and state at removal, lactation length and lifetime performance.

By managing lactation length over the past 10 years we have made a significant impact on overall production. Lactation length of the sows at removal increased over time. From 2001–2010 there was a 2.2 day increase in lactation length (Graph 1). History shows that when lactation length is managed we are able to decrease wean to first service intervals and increase our total born production.
The percentage of removal rate for sows that aborted prior to their removal have been fairly stable across the years for all parities however there has been a slight increase in 2009-2010 over the past years to 3.7% (Graph 3). When isolating just the parity 1 sows the removal rate for sows in an aborted state has jumped in the past 2 years from 2.7% in 2007-2008 to 4.8% in 2009-2010. Focusing on acclimatization for the gilts is a priority to keep the abort rate stable.

The data showed that Parity 1 sows had an average of 15% fall out over the ten years. With performance management that focuses on the gilt this number can and should be improved. To improve on lifetime performance we must focus on all aspects to help improve the longevity of our herds. Sow longevity is touched by many production practices including health stability, skilled production crews, genetics (leg structure), gilt development and nutrition.

Recently a collaborative of scientists have worked together (Boddicker et al, 2011) to understand the relationships between Quantitative Trait Locus (QTL) Analysis and Porcine Reproductive and Respiratory Syndrome virus challenge. They have identified genes such as the SSC4 that will help to select animals that have the ability to resist or handle PRRS better than others.

Skilled production crews are vital to influencing longevity of the sows. Death loss is a measurable that directly affects longevity. These teams generally have 5 years of accumulated pig knowledge, stability within working with each other, and engagement in continued learning. Fifty pigs weaned per lifetime is a possibility for our farms, as suggested by the scientific community. This goal will happen as more focus is placed on welfare and economics within the swine industry itself. We can and will improve and data derived from the farms will show us the way.

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Sasha Gibson, HND, is with the Fairmont Veterinary Clinic, Fairmont, Minn.; Jayne Jackson is product manager at PigCHAMP; Ames Iowa.
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