

There's More to Nursery Feeding than Diet Formulation

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Successful feed programs for early-weaned pigs need to overcome several challenges. Many of these challenges are interrelated. Thus, a significant shortfall in any one of these areas may still result in an acceptable feeding program leading to less than desired performance. We work with a wide range of production systems and interact with a wide variety of people including owners, managers, contract growers, owner operators, and frontline employees. Therefore, our objective is to describe common challenges that we encounter for feeding early-weaned pigs.

Challenge 1 – Communicate the message.

Do you understand the personality of the people implementing the program? We work with several producers that use formal personality profiling to enhance communication and categorize the most effective methods of communication. Usually, we find that if we are having a difficult time with compliance or getting the message across it is not the fault of the audience, but rather a need for communicating the message in a different format.

An example is communicating the importance of feeder adjustment. The importance of proper feeder adjustment for improving feed efficiency is well known. However, this remains the number one cause of sub optimal feed efficiency that we encounter on farms. When discussing feeder adjustment with personnel in the barns, few disagree that adjustment is important; however, there is much confusion as to how much feed should be in the pan for optimal feed efficiency. We have found using pictures of a properly adjusted feeder has been a very effective communication tool. Therefore, everyone is working from the same standard.

Challenge 2 - Start out with healthy pigs.

Without a doubt the Swine Industry has restructured dramatically in the last decade to harness the health benefits of multi-site pig production. While extremely successful at minimizing the impact of chronic disease, the impact of viral agents such as porcine reproductive and respiratory virus, swine influenza, and circo virus have increased. Field reports seem to indicate dramatically enhanced nursery growth performance when PRRSV elimination programs have been successful. Other reports indicate that *E. coli* associated post weaning scours are a problem in many operations. Therefore, it is imperative to deal with health challenges immediately with proper diagnostics and an appropriate therapeutic plan. Unhealthy weaned pigs lead to significant challenges in achieving rapid increases in feed intake during the critical first few days after weaning. Unfortunately, we have not found any magic ingredients or diet formulations strategies to eliminate the negative effects of health challenges on feed

intake of newly weaned pigs. The margin of safety in budgeting and diet complexity must be increased when dealing with groups of pigs with health challenges.

Challenge 3 – Perform proper cleaning, disinfecting, and drying.

It has been well documented that animal performance is increased in “clean vs dirty” environments and cleanliness is probably responsible for a large percentage of the growth performance benefits from All/In-All/Out production. Also, because the young pig is more susceptible to infections from enteric organisms, sanitation is especially critical for nursery facilities. Rough surfaces such as concrete are more difficult to clean than smooth surfaces such as wire. This indicates that while cleaning is performed less often in wean-to-finish facilities cleaning procedures of the concrete surfaces will be more difficult. In general, organisms are protected against agents of disinfection by organic materials such as pus, serum, or feces. Fortunately, most swine pathogens only survive for a brief amount of time outside the host in the absence of organic materials or moisture. Up to 99% of bacteria can be removed by cleaning alone under experimental conditions. However, the relative importance of the stages of sanitation include: 1) 90% removal by removing all visible organic matter, 2) 6 to 7% killed by disinfectants, and 3) 1 to 2% killed by fumigation.

A recent article by Dr. Amass from Purdue indicates that disinfecting boots was ineffective at reducing bacterial load of boots if the fecal matter had not been removed before disinfecting. They indicated that removal of fecal matter alone without disinfecting was responsible for a large proportion of bacterial load on the boots. Implications of this research are that visual assessment of cleaning procedures is an effective starting point as an indicator of reducing bacterial load.

Challenge 4 – Set the barn up properly before the pigs arrive.

In addition to sanitation, procedures that need to be completed before arrival of pigs include setting ventilation controls to allow for the room to dry and warm up. If used, mats and supplemental heat sources should be in place and functioning. All waterers should be functioning and adjusted to the proper height. These procedures are especially critical for wean-to-finish facilities where facility design is not as conducive to meeting the environmental needs of newly weaned pigs.

Regardless of whether the first diet after weaning is in bags or bulk, the feed gate in all feeders should be closed before the first pellets are placed in them. The feed gate then is opened so that a small amount of feed is visible in the feed pan. Placing pelleted feed into empty feeders with the gate open will result in large amounts of feed wastage and difficulty in achieving the proper feeder adjustment.

During the first 36 hours after weaning, pigs need to find the water and feed. During this time period, height adjustment of waterers should be rechecked to ensure proper access to water for pigs. Feed should always be available in the feeder and small amounts of feed should be placed on the mats to encourage feeding behavior. Also during this period, the environmental temperature and zone heat should be adjusted to ensure that the pigs are comfortable. Standard environmental temperature recommendations are difficult to generalize due to differences in effective temperature

due to flooring materials, heating sources, and drafts. Therefore, the objective during immediate period is to make minor environmental adjustments and let the pigs rest and acclimate after weaning.

The transition period immediately after weaning is a critical time in nursery management. Water intake is crucial in the newly weaned pig. Because of the low body weight in proportion to metabolic rate, dehydration occurs easily in young pigs. The unguarded center-flow water nipple has worked well in the SEW nurseries at Kansas State University to facilitate drinking and prevent dehydration. In addition, it is important to ensure that the water pressure is below 20 psi, so that pigs can easily operate the water nipples. Many producers block or tie the nipples open for the first 24 hours, so that the newly weaned pigs rapidly find the waterer. Cup waterers have been used successfully in other nurseries. A simple rule of thumb to use for height adjustment of nipple waterers is shoulder high for the *smallest* pigs in the pen.

If all of the proper preparatory procedures are performed, the pigs can be left to rest for approximately 36 hours after weaning. Pigs should be observed to ensure that they have found the water source and are beginning to develop feeding behavior.

Challenge 5 - Cost effective diet formulation and high ingredient quality.

Maximizing feed intake after weaning reduces stress and increases growth rate by decreasing the mobilization of lipid stores to provide energy for protein deposition. As feed intake increases after weaning, a lower effective environmental temperature is needed to maximize pig growth performance. Therefore, a rapid increase in feed intake is a high priority when weaning lightweight pigs because of their relatively larger amount of heat loss compared to heavier pigs.

Ingredient quality is imperative for the nursery diet. Careful specification of ingredients, such as using edible grade dried whey, and a high quality fishmeal helps ensure that high quality ingredients are used in the diet.

Slight alterations in the feed budget can be made based on a minimum feed mill order, size of the delivery compartments or trucks, and location of the nursery on delivery routes from the feed mill. Synchronization of optimum feed processing and delivery in nursery feeding programs represents a significant opportunity to increase efficiency and decrease cost.

Challenge 6 – Maximize pigs weaning weight and age.

The optimal feeding patterns for lactating sows continue to be debated. However, the research results in this area are clear. Restricting feed, protein, or energy intake during any period of lactation will reduce milk production, decrease litter-weaning weight, and impair subsequent reproductive performance. With the implementation of early weaning strategies, the importance of litter weaning weight also has increased. Pigs weaned at heavier weights are simply easier to manage in the nursery. Other data indicate that pigs with lighter weight at weaning are at a higher risk of death. Unfortunately, management-induced energy deficiency during lactation is a major problem on many commercial swine farms.

Challenge 7 - Assist pigs and teach feeding behavior.

By 36 hours after placement, most pigs will have found water and started to exhibit feeding behavior. However, this is a critical time period to identify pigs that are lacking proper feeding behavior or are becoming dehydrated. This may involve hand feeding a few pellets or using a gruel administered with a syringe. We believe that teaching feeding behavior to a small number of pigs is essential. Developmentally pigs weaned at earlier ages do not learn to eat dry diet as quickly as conventionally weaned 21-d-old pigs. The identification of candidate pigs for teaching feeding behavior is a high priority during the first few days after weaning. This is an area of pig management that requires astute observation of pig behavior. Therefore, it is an area on which personnel should concentrate efforts and veterinarians and managers should concentrate training. With proper management of the nursery, the number of pigs requiring extra attention will be limited to 2 to 4%.

The most difficult part of the process involves identifying the small percentage of pigs that are candidates for individual attention. The critical times are approximately 36 to 60 hours after weaning for identifying pigs that are having a difficult time learning proper feeding behavior. For example, for a group weaned on Thursday morning, the critical time period is Friday evening through Sunday morning. Pigs that are eating well will begin to have round abdomens, whereas pigs that have not begun to eat will be gaunt. Although most veterinarians and experienced nursery managers automatically and unconsciously evaluate signs that a pig has not begun to eat, many untrained personnel will have a difficult time identifying the signs. The following mental checklist can be used to inspect pigs from a distance:

- Mental status – alert or depressed
- Body Condition – normal or thin
- Abdominal shape – round or gaunt
- Skin – sleek appearance vs fuzzy
- Appetite – feeding at the feeder or huddled
- Signs of dehydration – normal or sunken eyes

Depressed mental status, thin body condition, gaunt abdomen, fuzzy appearance, huddling, and sunken eyes are all good indicators that a pig has not been eating or drinking. Palpating mucous membranes of the mouth or tip of the nose can identify signs of dehydration. Dehydration can be evaluated further by pinching a fold of skin. If the fold remains elevated for more than a few seconds the pig is dehydrated. A good location to do the skin fold test is just behind the front limb. Evidence of urination or defecation also is a reliable sign that pigs are eating and drinking.

Once pigs have been selected for further attention, they should be marked so they can be rechecked until they are feeding on their own at the feeder. One technique that has worked well in several operations is to have a person who can identify the pigs that are not feeding go through the nursery and mark them. This can serve as an excellent training tool. After all the pigs that are not eating have been identified, a small handful of pellets is wet with water and gently placed in each pig's mouth. Alternatively, if a large number

of pigs require attention a small bucket of moistened pellets can be prepared. Some personnel use gruel administered through a 12-cc syringe with the end cut off.

The moist pellets or gruel stick to the tongue of the pig, and it begins to swallow. The next step is to carefully place the pig near the feeder, so it associates the food in its mouth with the feed in the feeder. Setting the pig down gently is important, so pain or stress is not associated with feeding. In fact, people that have mastered the technique will be able to rapidly pick up the pig, resulting in minimal struggle. A good indicator of the operator's technique is that a large proportion of the pigs actually will eat from the person's hand. Hence, this method relies on patience and an understanding of animal behavioral principles.

As little as 20 to 30 g of feed will provide energy to keep the pig from starving. It is critical for small pigs with low body fat reserves to have a ready energy source. Our observations have indicated that in high-health-status, segregated, early-weaned pigs, signs of anorexia, depression, and dullness are more likely to be caused by lack of energy than infectious disease. Thus, giving them feed rather than treating them with antibiotics has saved pigs.

Challenge 8 - Minimal sorting and mixing of pigs.

It appears that in multi site production systems with a fairly narrow weaning age spread per group that minimal sorting and mixing result in better growth performance. In some production systems, we have observed that up to 17% of pens are left empty at the beginning of the nursery period for sort pens. However, these strategies rarely result in excellent performance. Research with finishing pigs consistently has demonstrated that sorting by weight does not improve growth performance. Preliminary evidence from experiments that we have been involved with indicates that there is no advantage to sorting by weight categories upon initial placement into the nursery. While minimizing sorting and mixing of pigs is advocated, lack of individual pig care, such as removing sick or disadvantaged pigs, is not.

Challenge 9 - Adjust the feeders frequently.

“If your fingers don't ache from cleaning the feed gates, you are not adjusting them properly.”

We have observed decreased growth rate as a result of improper feeder adjustment. In an attempt to stimulate feeding behavior, large amounts of the first diet are placed in the feeding pan. Although intention is correct, the outcome is negative. Energy deficiency can result from pigs “sorting” the diet and a buildup of fines in the feeding pan. These fines then lodge in the feed agitator mechanism, making it difficult for new feed to flow from the feeder. This problem is remedied by management of the amount of feed flow in the pan to stimulate development of feeding behavior. Approximately 25 to 50% of the feeding pan should be visible in the first few days after weaning. As the pigs become more accustomed to the location of the feed and adjust feeding behavior, the amount of the feed in the feeding pan should be decreased rapidly to less than 25% coverage. Also, feed agitators need to be tested frequently to ensure that the buildup of

fines does not prevent them from working freely.

Challenge 10 - Compile and analyze closeouts.

Nursery closeout records are essential for diagnosing nursery performance problems. Compiling accurate records is a constant struggle but essential for accurate monitoring of growth performance. When analyzing closeouts, it is very important to account for explainable sources of variation from group to group and adjust values accordingly.

Summary

Clearly, the challenges for feeding early-weaned pigs extend beyond diet formulation and nutrient requirements. Recognizing that many of these challenges are interrelated and addressing areas will lead to successful early-weaned pig feeding programs.