

Keys to a Productive and Profitable Start up

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▪ Introduction

Any producer or investor group which has undertaken the start up of a sow production unit knows that the process is laden with numerous potential pitfalls. As with any business plan, being informed about potential problems prior to the onset of the project will help to minimize economic losses and unnecessary frustrations.

The goal of this presentation is to list and discuss some of the factors, which I have observed to be important in achieving a productive and profitable start up. When this process is considered, there is no teacher like experience. However, considering the experiences of others should help to make the undertaking a little smoother. Topics will be discussed in the order they might unfold during a typical start up. I have limited the discussion to the breeding and gestation barn issues.

▪ Establishing Profitability

The first step in achieving a productive and profitable start up is to understand the fundamentals which drive profitability in a swine unit. The actual costs (i.e. labour, material, financing, consultant fees, breeding stock, etc.) and benefits (i.e. market conditions, contracts, etc) will play a crucial role in establishing profitability. However, I will concentrate on the profitability factors that are associated with production during the start up period.

In recent years, the concept of "Capacity Utilization" has become a frequent consideration in the swine industry. Capacity Utilization describes how well the performance of a production unit matches the potential performance for the facility in which it is operating. Since the fixed costs for a facility are the same regardless of the production level being achieved, it is clear that when

production is maximized, the fixed cost per piglet produced will be minimized. As a result, marginal profit is maximized.

▪ **Evaluating Facility Design**

The evaluation of the facility design is an important first step in insuring that a balanced facility will be constructed. All too often, the design of breeding, gestating, and farrowing facilities are based upon a poor understanding of proper pig flow. It is not uncommon for properly designed barns to be altered during the construction process to address short term cash flow issues or ill conceived concerns of the investor. A poorly designed facility will create restrictions on the potential productivity of the unit. As a result, the investor may expect unrealistic production from the facility. Financiers will wonder where the cash flow is and employees may be unfairly judged to be under achievers.

▪ **Level of Production**

In order to maximize the Capacity Utilization of a facility, the level of production expected must be clearly established. In the case of sow production facilities, the ideal number of Pigs Weaned per Group must be established. This number will usually refer to the number of Pigs weaned per week when once per week weaning occurs. However, there are systems where production may be based on 6 day cycles or twice weekly weaning. In any case, this parameter is usually established by the requirements of the grow/finish system for which the weaned pigs are destined.

The number of Pigs Weaned per Group should drive facility design. It is in the translation of this number to the physical facility layout requirements where most barn design plans fail. Once the Pigs Weaned per Group is clearly established the major contributing levels of production can be calculated. Some of the key considerations in establishing a properly balanced facility are as follows:

- ▶ Expected Pigs Weaned Per Litter
- ▶ Expected Females Weaned Per Group
- ▶ Expected Females Served Per Group
- ▶ Expected Farrowing Rate
- ▶ Expected Females Farrowed Per Group
- ▶ Expected Efficiency of Non Productive Day Management

- ▶ Gilt Pool Requirements
- ▶ Boar Requirements

▪ **Project Management**

The value of good quality Project Management should never be underestimated. A project manager can make timely and important construction and equipment installation decisions which will have an impact on the performance of the herd over the long term. An important component of Project Management includes a working knowledge of the day to day operations of a Sow production unit. In some cases, investor groups have hired the herd manager during the construction process so that that person could be involved in the process and have impact on these sorts of decisions.

▪ **Staff Training**

Staff training is an essential part of insuring a productive start up. As our industry grows, the likelihood of hiring staff with minimal experience increases. As a result, the need for training increases dramatically.

However, we know that even the most seasoned swine husbandry personnel benefit from a basic review of swine husbandry skills.

Training sessions are most effective when delivered in close association with events that occur in the unit. This sort of delivery allows workers to apply what they have learned in the practical work environment shortly after they have learned about the subject. As well, there are numerous good quality training programs being offered through swine veterinary clinics, community colleges, provincial government agencies and universities.

▪ **Establishing Biosecurity Rules For Start up**

Invariably, the construction process will not be complete when the first animals arrive on site. As a result, there may be a relatively high amount of traffic in the vicinity of the barn when the production activity begins. It is important that there are clearly defined biosecurity rules in place for the barn staff and construction crew during this phase of the project. In most cases, the staff will be unable to utilize the long-term entry area. The short-term solution should be to create an acceptable changing area where outside clothing and footwear can be removed without contaminating inside clothing and footwear. The construction staff

should understand that the livestock area is strictly off limits. As well, construction staff should not have contact with any other swine.

▪ Gilt & Boar Supply

When populating a new swine facility, it is important to establish the source of stock and delivery schedule of the gilts and boars which will enter the herd.

Source of Stock

If possible, gilts should originate from a single source. However, it is often difficult to complete a new herd fill from a single source and compromises are made in order to populate the unit as quickly and efficiently as possible. A good compromise will combine gilts from units that have an established history of being compatible. Vaccination prior to integration may need to be considered and should be discussed with the consulting veterinarian.

Delivery Schedule

The delivery schedule should be established before the actual populating procedure begins. This will insure that the breeding stock supplier has identified the timing and availability of the stock. Receiving the gilts and boars in a timely fashion is a critical factor in achieving maximum facility utilization. If the correct number of gilts and boars are not present at the correct time, a production and cash flow shortfall will be inevitable.

The delivery schedule should include some flexibility since several factors will play a role in determining the ideal number of open gilts present in the barn at any one time. Below I have listed some variables that will have a bearing on this process:

- ▶ Age at Entry
- ▶ Entry to Estrus Interval
- ▶ Average Age at Puberty
- ▶ Quality of Puberty Induction and Heat Detection
- ▶ Breeding on 1st vs 2nd Estrus
- ▶ Culling protocols for non-cyclers and repeaters

Boar Considerations

The appropriate boar population for a startup unit is frequently underestimated. The most common error occurs when the frequency of usage is estimated for

young boars. All too often, production plans for the start up estimate that young boars can be used at the same frequency as mature boars. Important factors to consider when establishing the number of boars required are listed below:

- ▶ Level of Natural Mating vs. Artificial Insemination,
- ▶ Expected Farrowing Rate,
- ▶ Targeted number of Farrowings per Group,
- ▶ Expected Matings per Service,
- ▶ Expected Percentage of Active Boars,
- ▶ Requirement for Mature Boars for Gilt Stimulation.

■ **Attaining Breeding Targets**

Once the breeding facility is complete, the unit will be ready to accept its initial group of gilts and boars. Breeding barn workers must have a concept of the chain of events that will occur within the unit and the biological factors that will effect the success of their breeding program. Understanding these factors and knowing what to expect along the way will help them to plan ahead, make day to day decisions and maximize their goals.

Age at Entry

A key issue during the startup period is the age of the gilts at entry. With genetic selection for rapid growth, it is common for gilts to be delivered at a relatively young age. It is important that an accurate age at entry be documented and considered when managing gilts in the post entry period.

If gilts are delivered near the average age of puberty for the particular genotype involved, it is reasonable to expect a relatively high percentage to show an estrus cycle within 30 days of delivery. If conditions are appropriate, between 85 - 90% of delivered gilts may cycle with 30 days following delivery. However, it is common for the age range of delivered groups of gilts to vary significantly. A brief review of the age ranges observed within selected start ups show a range of 140 - 210 days of age. The expected Entry to 1st Service Interval may vary considerably as a result of the age at entry. If birth dates accompany the gilts at arrival, the breeding staff will have a valuable tool in assessing the heat detection program with regard to this factor and will be able to manage the gilts appropriately.

Induction of Puberty

In most start ups, the majority of gilts entering the unit will be prepubertal. That is, they will have never gone through an estrus cycle. Regardless of age, it

should be the directive of the breeding barn staff to induce puberty in these gilts. Appropriate boar exposure is an essential component of this process. Aherne and Kirkwood (1997) have shown that daily exposure to a boar will reduce the age at which puberty is attained. Gilts which have had no boar exposure will reach puberty at a relatively older age.

Depending upon the breeding barn design, the ability of staff to complete good boar exposure will vary. Direct boar to gilt contact (within the same pen) is superior to fence-line boar contact for inducing puberty and detecting heats. Breeding barns that incorporate pens will allow for some direct contact to occur. However, in most cases, exposing all gilts to direct boar contact is difficult due to the level of labour involved in moving gilts and boars in and out of their stalls. Most managers rely upon fence-line contact and incorporate direct contact as it is possible.

Estrus Detection

Many breeding barn staff find estrus detection in gilts to be difficult. The signs of estrus are often subtle and the conditions for estrus detection are not always ideal. Part of the process is understanding the fact that gilts can actually habituate to the presence of the boar. As a result, a gilt may be in estrus yet fail to show strong signs since she has habituated to the boar's presence. Staff need to create routines for boar exposure which take this fact into account and avoid the potential for habituation.

Most consultants will emphasize that detecting estrus twice daily in gilts is an important part of attaining properly timed matings. In reality, there are very few start ups where this can be implemented on a regular basis. The failure to apply this technique is generally related to labour and time limitations. In many cases, properly applied boar exposure and estrus detection to all potentially cycling gilts on a daily basis will be a major accomplishment.

Breeding on First Heat Vs Second Heat

During the start up, many rules of swine husbandry are challenged and may be compromised in order to attain weekly breeding targets and maximize facility utilization. In preparation for the onset of breeding, the question will invariably be asked, "Should we breed our gilts on the first or second heat cycle following arrival?" This question will elicit various answers within the industry. In most cases, the argument centers around how to best maximize litter size in 1st parity litters. I subscribe to the research which indicates that it is most cost effective over the life-time of a sow to induce the pubertal estrus cycle as soon as possible following arrival and then breed on the second estrus cycle. However, it is my opinion that this rule should be applied during the regular management of an established herd's gilt pool. During the start up, the majority of gilts are bred when their estrus cycle can be utilized to attain breeding targets. The ideal

of breeding on the 2nd estrus cycle is targeted when possible, but should be over-ruled when necessary. The reason is that the directive during start up is to attain breeding targets at all costs. Gary Dial (1996) has shown that the number of breedings attained plays a stronger role in maximizing "Capacity Utilization" than the actual pigs weaned per litter. The bottom line is that you must keep the crates full at a steady rate. The other factor is that there are space limitations during start up which can make it very difficult to hold gilts until their 2nd estrus cycle.

Natural Mating vs. Artificial Insemination

The use of Artificial Insemination (AI) has grown dramatically in North America during the past few years. Inevitably, many new herd managers and investors will ask if and how it should be used in their facility during start up. Although there are exceptions, most consultants feel quite strongly that AI should only be used on a limited basis during the start up period. The degree to which the technology should be incorporated will depend upon the technical expertise of the breeding staff and the limitations of the facilities.

The most common recommendation is to use natural mating on the first breeding of each service and to complete subsequent breedings using AI. Using natural mating on the first breeding will help to verify that the gilt is actually in good standing estrus and the breeding is appropriately timed. Many managers will comment that subsequent AI breedings are of better quality when the initial breeding is natural. Another obvious advantage of incorporating natural mating during the start up is that the level of boar produced pheromones is increased within the environment. Boar pheromones will induce puberty in the prepubertal gilts and help to stimulate estrus in the cycling gilt.

Culling Policy (Repeaters & Non Breeders)

As the breeding program advances, the issue of rebreeding repeat gilts will arise. When the conception rate of gilts and sows bred on repeat estrus cycles is assessed, most databases will show that with each repeat estrus cycle the likelihood of conceiving decreases significantly. However, under certain conditions, this rule may not hold true. If the animal repeats because of poor breeding technique, then the likelihood of conceiving on a repeat estrus cycle will stay relatively constant. If the animal repeats because of being an inherently poor breeder, the conception rate may drop by 50% for each subsequent repeat estrus service.

In general, I recommend the following:

- ▶ Breed all gilts on their first repeat estrus service,
- ▶ Cull gilts on their second repeat estrus service unless their service is needed to reach breeding targets,
- ▶ Repeat estrus services should make up less than 10% of the total services. Remember that as the percentage of repeat estrus services increase, the likelihood of attaining a good conception rate drops dramatically.

Every start up herd will have to deal with gilts that do not appear to show any outward signs of estrus following arrival. Potential explanations include:

- ▶ Non breeders
- ▶ Poor estrus detection technique
- ▶ Failure to attain puberty due to young age at arrival or other factors.

These are some factors that may be reviewed when addressing this concern. Gilts will usually be observed for signs of estrus for at least 30 days following entry before any intervention is attempted. If the rate of non-cyclers seems to be within normal limits by 30 days, the likelihood is that the non-cycling animals are truly non-cyclers. In general, “normally accepted” levels of non-cycling gilts will vary from 5 -10%. Removal of non-cycling gilts will be based upon the comfort level which the manager has reached with regard to their non-cycling status. It is very difficult to remove a gilt with good conformation if one lacks faith in the puberty induction or estrus detection process. In most cases, the breeding manager needs to insure that a good heat detection program is in place and to aggressively remove animals which have failed to show good signs of estrus. These animals have proven themselves to be poor breeders and should not be maintained in the herd. The production units, which are aggressive in this area, tend to select for fertile breeding stock and usually have the best conception rates over time.

Hormonal Manipulation

To attain the best utilization of the breeding and farrowing facilities, it is important to achieve consistent breeding targets. During a start up, the distribution of gilts showing estrus do not always fit into the desired pattern. In many cases, breeding managers decide to breed every gilt that cycles with no consideration given to upper and lower limits of the breeding target range. The end result is an erratically fluctuating flow of pregnant animals into the farrowing area. This phenomenon invariably results in erratic cash flow and variable piglet quality.

Opportunities exist whereby these fluctuations can be minimized. In many cases, estrus cycles may be induced or manipulated using hormonal therapy (Kirkwood 1998). Below I have listed some common treatments used to achieve these goals:

Progestagen (Regumate®- Hoechst-Roussel)

Utilizing this product in swine is an “off label use” and must occur under veterinary supervision. This product is applied orally on a daily basis. When applied in the appropriate manner, an upcoming estrus may be delayed to fall within the desired time frame. Although many producers consider this process to be too expensive and labour intensive, the opposite is true. This product can be used in a cost-effective manner and will pay dividends.

PMSG and FSH (PG600® Intervet)

During the start up period, this product can be used to induce estrus in pre-pubertal gilts. Most breeding managers will come to understand very quickly when this therapy is an option for them. In my experience, the product will often be administered to those gilts which have not cycled within 30 days of their arrival in the unit. The success rate of this approach can be quite high (80-95% response rate). I have generally interpreted a high success rate in non-cycling gilts as an indication of the fact that they were actually pre-pubertal. If a breeding manager experiences this sort of success rate, he/she may use the product to induce heats when an upcoming downturn in breeding numbers is predicted.

Prostaglandin F_{2a} (PGF)

When over-breeding occurs and there are too many pregnant gilts in any one time frame, the breeding manager may choose to induce some gilts to abort through the use of an appropriate prostaglandin injection. When applied at the appropriate time, the gilt will abort and return to estrus shortly following the abortion. The gilt may be re-bred on the ensuing estrus in order to achieve breeding targets.

Sow Flow During Startup

When a breeding barn and gestating facility is designed, the breeding area will often be designed to hold bred animals for a specific time frame before being heat checked, pregnancy checked, and moved to the gestation facility. It is important for breeding managers to understand that in the start up period these rules of sow flow are usually discarded in order to meet the day to day demands of the start up breeding schedule.

During the start up, the breeding area is managed as an enlarged gilt pool. Bred groups of animals will usually be moved to the gestation barn as soon as

possible following breeding so that more gilts can be received and managed appropriately (i.e. Boar exposure for puberty induction and heat detection, oral progestagen therapy, etc.).

Whereas open animals would normally be removed from the breeding barn (i.e. 21 day heat checks and pregnancy checks) prior to their movement into the gestation barn, the start up pig flow creates a different scenario. With gilts being moved to the gestation barn shortly after breeding, the 21 day heat checks and pregnancy checks will be completed in the gestation barn. Open gilts will be returned to the breeding barn. This will create open stalls in the gestation barn that must be filled. The remaining pregnant gilts must be moved together so that total barn space is used efficiently.

▪ **Real Time Ultrasound Pregnancy Detection**

The advent of Real Time Ultrasound (RTU) pregnancy diagnosis has provided an excellent tool for the swine industry. It allows the breeding manager to assess the pregnancy status as early as 21 days post breeding with a high degree of confidence. The expense of the unit can be a disincentive for producers and an efficiently managed operation will find it difficult to justify the cost. However, most units that have purchased and utilized the product will testify that it is an invaluable labour saver which offers an rapid return on investment. Larger units see it as an insurance policy to help identify a conception crisis early. Incorporating the product into the breeding management program must always be carefully scrutinized before a decision is made.

The breeding target for most start ups will be based upon a relatively low expected farrowing rate. Initial targets will error on the side of caution so that farrowing crates are not underutilized. RTU allows the breeding manager to establish the actual conception rate of the breeding program within 4-5 weeks of the onset of breeding. After a clear trend is established, breeding targets can be adjusted immediately. If the conception rate is lower than expected, trouble shooting can be completed to address the problems. If the conception rate is higher than expected, breeding targets can be lowered accordingly.

The labour involved in stimulating estrus, breeding gilts, and moving gilts is often overwhelming. Heat detection in bred gilts will often be the first area to suffer. The best method to address this issue is to supply enough labour to complete the task of heat detection properly. In situations where addressing the labour issue is not possible, RTU can help the breeding manager to eliminate open gilts from the gestation area. However, RTU should never be used as a replacement for timely heat detection.

▪ Conclusion

In summary, the goal of any unit is to maximize "Capacity Utilization" so that profit can in turn be maximized. The breeding barn manager must understand that attaining breeding targets within an established range will provide a steady flow of product.

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