

7. FEEDING THE SUCKLING PIG

Young piglets have a great capacity for growth, much greater in fact, than is commonly recognized. Growth in the suckling piglet is primarily limited by insufficient intake of milk or of alternative sources of nutrients. Because practical approaches for transferring more nutrients from the sow to the piglet are not yet available, it is the producer's job to get more nutrients into the piglet so that growth can be maximized.

Improving a piglet's pre-weaning growth rate makes a major difference to the rest of its growth cycle. There is a strong positive correlation between weaning weight and post-weaning performance (Table 7-1). Compared with their lighter contemporaries, piglets that are weaned at a body weight of 7 kg or heavier are less susceptible to post-weaning diarrhea, will have less post-weaning growth lag and will require a less complex diet after weaning.

Table 7-1. Effect of Weaning Weight at 25-29 Days of Age on Piglet Performance to 78 Days of Age.

Weaning weight (kg)	78 day weight (kg)	daily gain (g/d)
6.14	30.40	454
7.95	35.60	529

Another point in favour of increased pre-weaning growth rate is decreased pre-weaning mortality. Pre-weaning mortality is one of the major factors reducing swine production efficiency. A pre-weaning mortality of 5% is possible, but on most commercial farms, 7 to 30% of piglets born alive do not survive until weaning. The majority of deaths occur within 72 hours of birth, with at least 50% occurring in the first 24 hours. Often pre-weaning mortality is caused by a number of factors, many of which are related to insufficient energy intake (milk consumption) and excessive body heat losses. In order to minimize energy losses, nursing piglets should be provided with a warm and draft-free creep area in the farrowing crate or pen.

Photo 7-1.



It is now recognized that the nursing piglet has much greater potential for growth than was previously acknowledged. The problem is to supply sufficient nutrients to the piglet to allow greatest genetic potential.

The Importance of Colostrum

The first requirement for successful piglet feeding is to ensure that each newborn receives an adequate supply of colostrum. Colostrum is the first milk produced by the sow after parturition; its function is to provide nutrients and other essential substances in a highly concentrated form. In addition, colostrum helps to increase disease resistance in piglets by providing immunization with immunoglobulins (also called antibodies). Immunoglobulins are proteins, absorbed by the newborn pig's gut, that provide protection against disease.

The immunoglobulin concentration of sow's milk declines very rapidly after farrowing. In addition, as a result of a process known as gut closure, piglets rapidly lose their ability to absorb immunoglobulins. If piglets do not suckle during their first 24 hours, they have a greatly reduced chance of obtaining adequate immune protection and may not survive. A point to remember: immunoglobulins present in the colostrum are effective only against diseases to which the sow has been exposed. If pregnant sows are brought into a new barn and farrow within 21 days, they may not protect their offspring against bacteria present in the new barn. Scouring in newborn piglets is one symptom of inadequate sow exposure to disease-causing organisms.

To ensure all piglets acquire colostrum, producers should take the time to observe litters shortly after farrowing and assist weak piglets to suckle by giving them access to the sow's udder. One way to give access is called "split suckling". Shortly after birth, half the piglets are removed from the sow and are kept in a warm, dry box. The two halves of the litter are rotated on and off the sow to give individual piglets maximum opportunity to suckle and receive colostrum.

Currently, commercial products that contain immunoglobulins and highly digestible energy sources are available. An oral dose of these products may reduce a newborn piglet's need for its mother's colostrum.

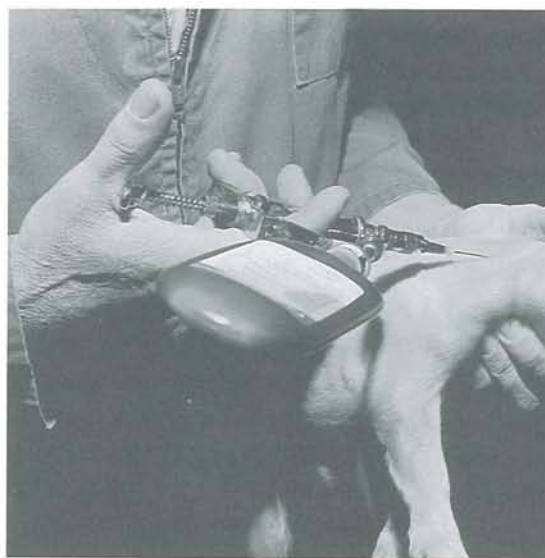
Another way to ensure piglets receive some colostrum is to keep a supply of cow colostrum in the freezer and give weak and unthrifty piglets an oral dose (using a small syringe) if they have had inadequate suckling of their mother's colostrum.

The Need for Supplementary Iron

Based on nutrient content and availability, sows' milk is generally accepted as the nearly perfect food for the very young piglet. The only nutrient that is present in sub-optimal levels is iron. Because of this deficiency, piglets require supplementary iron or they will become anemic and die.

The iron deficiency in sow's milk can be overcome by the administration of iron dextran either orally or by an intramuscular injection. The amount of iron required to meet their requirements largely depends on the age at which the piglets are to be weaned. Researchers have calculated that piglets require approximately 10 mg of iron per day to allow growth at their maximum rate. Therefore, if piglets are to be weaned at three weeks, a single injection of 150-200 mg of iron dextran is sufficient. However, if piglets are to be weaned later, a booster shot may be required between days 14 and 21. A means to check the adequacy of iron injections is to monitor haemoglobin levels in the blood of the young piglets. The levels should be higher than 8 ml/100ml. Iron injections should be administered in the neck rather than the ham to avoid staining of the most valuable cut in the pig carcass.

Photo 7-2.



Iron injections should be administered in the neck to avoid staining the ham at the injection site.

Although iron supplementation is crucial to the suckling piglet's well-being, excess iron may increase the incidence of scouring and susceptibility to bacterial infections. Iron is generally found tightly bound to protein in the suckling pig's body. This binding limits how much iron is accessible to bacteria. However, if iron is present at a level beyond the capacity of these proteins to bind it, pathogenic bacteria may proliferate. Therefore, take care to ensure that piglets are provided with adequate, but not excessive, iron supplement. Iron injections occasionally result in the rapid death of some piglets, which may indicate a vitamin E and selenium deficiency.

Water Requirements

Piglets require water immediately after birth and should be offered water from their first day, especially in warm conditions. Providing drinking water to very young piglets does not reduce their motivation to suckle; rather, they benefit from supplemental drinking water, especially if the sow milks poorly and they do not consume enough water in the limited amount of milk they receive. Litters that gain poorly during the first one to three days after farrowing drink more water than faster growing litters. Provision of a fresh water source is also beneficial in reducing stress that piglets

undergo at weaning. Pigs accustomed to drinking from a watering system prior to weaning will experience fewer problems with water intake after weaning. Make the water source easy for newborn piglets to find. Piglets take too long to find and use a nipple drinker so a dish drinker located in the creep area is a better choice, at least until the piglets are accustomed to consuming water. If water nipples are to be used, then these should be pointed downward to discourage piglets from playing with the nipple and wasting water.

Use of Milk Replacers

Milk replacers have been used quite successfully to raise orphan piglets or surplus piglets from large litters. Milk replacer may also be offered to piglets while they are with the sow in the farrowing crate to increase weaning weights and reduce variation in weaning weight in early weaning programs (weaning age 21 days or less). A point to remember: if milk replacers are used, piglets must still obtain colostrum from the sow or another source, such as cow colostrum.

Photo 7-3a.

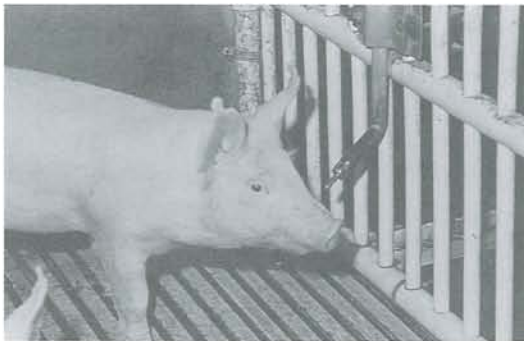


Photo 7-3b.



Piglets should have ready access to water.

Photo courtesy: Centre for Food and Animal Research, Ottawa.

Artificially reared piglets should be fed milk replacer frequently (4 to 6 times daily) and in small doses (10 ml of milk replacer per pig at first). Daily consumption of milk replacer may be gradually increased to 300 to 400 ml per piglet at which time dry feed should be introduced. Prevent over-consumption of milk replacer and take care to ensure the piglets do not get wet during feeding.

The successful use of milk replacers to reduce pre-weaning mortality in runt pigs has prompted the development of several mechanical devices or “artificial sows” which are designed to automate the delivery of milk replacers. The manufacturers of these devices claim that a piglet can be fostered onto an artificial sow as early as 3 days of age.

The need and use of milk replacers in the commercial swine industry is anticipated to decrease as more complex creep and early weaning feeds are developed. Some of the early weaning dry feeds can support good levels of performance in piglets weaned at 7 days or earlier (see chapter 8).

Creep Feeding

The sow generally reaches her maximum milk production during the third week of lactation; thereafter, milk production declines steadily. Because of her reduced milk production, the sow is unable to supply sufficient nutrients to meet the steadily increasing demands from growing piglets. If the young pigs’ rapid growth rate is to be maximized, the gap between their nutrient requirements and the nutrients supplied by the sow’s milk must be filled by means of creep feeding.

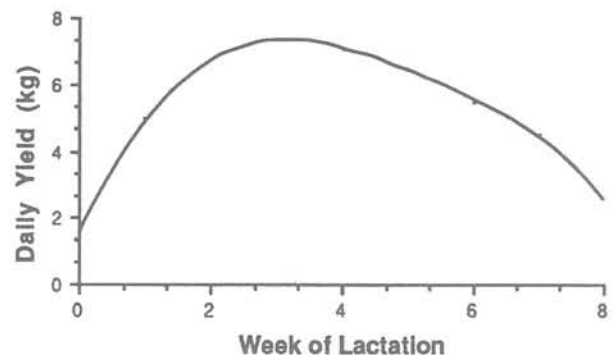


Figure 7-1. A lactation Curve for a Sow.

Benefits of Creep Feeding

The benefits derived from creep feeding have been amply demonstrated. The most significant benefit is that piglets are heavier at weaning. In a typical four week weaning program, weaning weights may be as much as 10% higher if high quality creep feeds are used. For piglets weaned at an earlier age, the intake of creep feed is generally insufficient to stimulate heavier weaning weights.

In addition, the variation in weaning weights within a litter may be smaller, i.e., fewer runt pigs in the litters at weaning. The response to creep feed will also depend on litter size, the individual sow's milking ability and the quality of creep feed.

Creep feeding can also minimize the setback that piglets undergo immediately following weaning. An abrupt change from a liquid diet to a meal diet is a nutritional stress that generally results in a growth check during which time pigs consume very little feed, gain little weight, and often suffer from scours. A gradual introduction to solid feed during the suckling period will develop the enzymes required for digestion, allow piglets to learn how to consume dry feed, and minimize the growth check. However, in order to achieve a reduction in setback after weaning through enhanced creep feed consumption, substantial amounts of creep feed must be consumed. According to some studies, this may be as much as one kilogram per piglet.

Creep feeding has also been shown to be beneficial to the sow. When creep feed is provided, piglets tend to suckle less intensively so sows tend to be in better body condition at weaning. As a result, these sows have shorter weaning to rebreeding intervals and higher conception rates than sows whose litters have not been provided with creep feed.

Creep Feed Formulation

Creep feeds are designed to supplement the nutrients contained in sow's milk. Therefore, creep feed does not have to provide all the nutrients required by the suckling pig. Digestibility and palatability are far more important factors in evaluating creep feeds than nutrient content. However, the suckling pig should still be supplied with a high

quality diet. Such a diet would contain at least 1.25% (up to 1.70%) lysine and 3400 - 3600 kcal DE/kg. This was demonstrated by recent studies conducted at the Agriculture Canada research station in Ottawa. In these studies, piglets were weaned at four weeks of age. Litters on high complexity, palatable diets ate more creep feed prior to weaning, tended to gain more during the week before weaning, and converted feed more efficiently. These piglets also gained more weight in the first two weeks after weaning as compared to litters that were fed a low-complexity, corn-soybean meal based diet.

During the first two or three weeks of life, up to approximately five kilograms body weight, a piglet's digestive enzymes necessary for the digestion of starch, sugar (sucrose), and non-milk proteins are present at relatively low levels. A piglet's digestive tract is best suited to digest milk proteins (casein), milk sugar (lactose), glucose, and specific fats so its diet should include ingredients such as skim milk, high quality whey products, high quality blood products, added fat (preferably fats with medium chain fatty acids, such as coconut oil, or unsaturated fats, such as corn oil, canola oil, or soy oil), cooked cereals (rolled oats or flaked corn), and glucose. In addition, small amounts of non-milk proteins should be added to encourage development of the piglet's digestive enzymes. High quality pre-starter (Phase I or MEW) diets may be used as creep feeds for suckling piglets weighing less than five kilograms (see chapter 8).

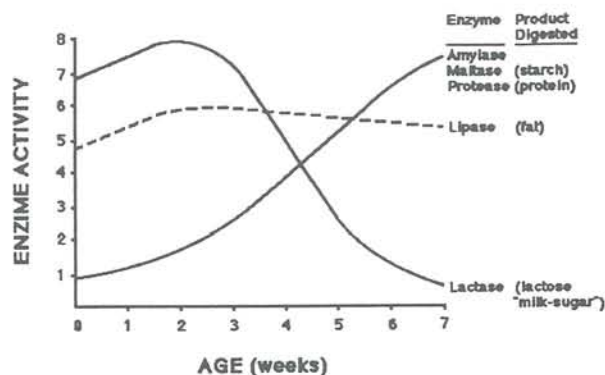


Figure 7-2. Digestive Enzyme Activity Pattern in Young Swine.

At approximately three weeks of age, or when body weight exceeds five kilograms, this largely milk-based diet can be replaced by a less expensive, pre-starter diet based on cereals and high quality proteins. In general, high energy grains such as corn or wheat as well as readily digested protein supplements such as soybean meal form the basis of most pre-starter diets. The pre-starter diet should still contain some of the high quality products that are included in creep feeds. Ingredients such as oat groats, flaked corn, fish meal, dried skim milk, dried whey, sugar, and fat are commonly added to increase palatability and digestibility. Pre-starter (Phase I or high quality Phase II) diets may be used as creep feeds for suckling pigs weighing more than five kilograms as well (see chapter 8).

Factors Affecting Creep Feed Intake

Creep feed consumption is affected by many factors. These factors include: the feeding system, feed palatability, the environment in which the piglet is housed, the sow's milk composition and yield, the piglets' health, vigor, and growth rate, and the amount of water available. A reasonable target creep feed intake for litters weaned at 4 weeks is about 2.5 kg of feed per litter. If litters are not achieving this level of intake, take steps to increase their creep feed consumption.



Creep fed piglets are heavier at weaning if weaning age is 28 days or greater.

One of the most important factors stimulating piglets to eat creep feed is the feed's freshness. All too often feed is placed in a creep feeder and left there to be fouled, attract flies, and become stale

before being cleaned and/or replaced. Little and often is the rule for creep feeding, with fresh creep feed supplied each day. Not only does this practice ensure the creep is always fresh, but the daily arrival of fresh feed serves to stimulate the piglets' inherent curiosity in the new material, which also helps to encourage consumption.

Consumption can be stimulated by feeding a pelleted or crumbled creep feed. Piglets fed pellets with a small diameter (0.4cm or smaller) or crumbles tend to eat more and waste less as compared to piglets fed pellets with a large diameter (0.5cm or larger). If small pellets or crumbles are not available, a short-cut pellet (2 - 3 mm long) is preferred.

Even though piglets have access to the sow's milk while eating creep feed, they must have access to fresh water if feed intake is to be maximized. If pigs are weaned after three to four weeks of age, creep feed intake will be reduced significantly without readily available fresh water. Pigs accustomed to drinking from a nipple waterer while in the farrowing crate will experience fewer problems in adapting to the watering system at weaning. However, water nipples should be pointed downward to discourage piglets from playing with the nipple and wasting water.

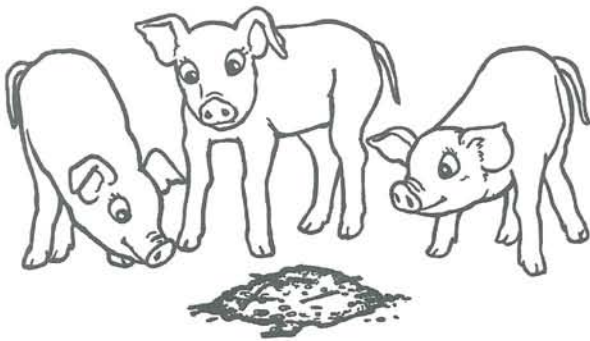
Research has shown that the location of the creep feeder in the pen does not affect feed intake or feed wastage. However, raising the creep feeder four inches from the floor has been shown to result in a significant reduction in creep feed wastage. Since creep feeds are relatively expensive, this simple procedure is certainly cost-effective.

Creep feed composition will affect how much piglets eat. As mentioned previously, ingredients such as oat groats, flaked corn, fish meal, dried skim milk, dried whey, sugar, and animal fat have been utilized to increase creep feed palatability. Many flavor-enhancers are currently being promoted as a means of increasing creep feed consumption, but research on the effectiveness of these artificial flavors is inconclusive so their use remains questionable.

Starting Pigs on Creep Feed

Piglets should be started on creep feed when they are about 7 days old by offering a little feed on a clean, dry section of the floor (use a board in farrowing crates with a slatted floor). Piglets are more likely to show interest in feed initially offered in this manner. Never offer creep feed within a couple of hours of the sow being fed; the litter will be suckling or sleeping and may not notice the feed. In addition, never offer more than 20 g/litter/day until the piglets are obviously consuming the feed.

Floor feeding should continue for the first three to four days or until the piglets are definitely eating the feed. When the litter is obviously eating the feed, a small feeder may be used. Since piglets prefer to feed together, the feed trough should be large enough to allow as many piglets as possible to feed at the same time. A fairly heavy, shallow, circular trough is suitable for this purpose because it makes the creep feed obvious and easily accessible to the piglets, as well as accommodating a fairly large litter.



Creep feeding should be introduced by placing a small amount of a good quality feed on the floor of the crate.

Creep Feed Induced Hypersensitivity

Creep feed made up of large quantities of certain ingredients, such as soybean meal and legume seeds, may contain some anti-nutritional elements. Exposing piglets to large quantities of these ingredients may provide dietary antigens which can develop a transient hypersensitivity in the young piglet's gut. After seven to ten days the hypersensitivity normally disappears, but in some

cases, the hypersensitivity can result in an immune response in the gut, damaging the intestinal tract lining. The damage can cause diarrhea in the newly weaned pig, and poor post-weaning performance. However, if creep feed is introduced early and large amounts are consumed prior to weaning, the immune system may develop a tolerance to feed antigens prior to weaning, and post-weaning scouring can be controlled. The effect of feeding strategies on changes in the piglet's immune system and hypersensitivity in the gut remains an active area of research.

Additional Reading and References

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