CREEP FEEDING HANDBOOK

PRAIRIE SWINE CENTRE

VOLUME 4

SaskPork · Alberta Pork · Manitoba Pork · Ontario Pork · Saskatchewan · University of Saskatchewan

TABLE OF CONTENTS

INTRODUCTION

Weaning is a stressful process for piglets; they are removed from the sow, moved to a new environment, mixed with non-littermates and expected to begin consumption of a solid diet. This all happens at a time when the piglets have immature digestive and immune systems. All these factors contribute to the growth lag often observed immediately post-weaning. This growth lag is characterized by piglets going off feed, reduced or negative growth rates and increased susceptibility to diseases in the first 24–48 hours post-weaning, sometimes resulting in mortality. There are different strategies available to help piglets around the weaning period, both before weaning and after weaning in the nursery.

One available pre-weaning strategy is creep feeding. Creep feeding is a management practice used to provide supplemental feed to piglets during the lactation period. The goal of providing creep feed is to reduce the post-weaning growth lag and to get pigs off to a better start. Creep feed contains highly digestible and palatable ingredients to encourage piglets to eat it. In a recent survey performed by Prairie Swine Centre and CDPQ, approximately 90% of farms provided creep feed in farrowing (Engele, 2024). The majority of these farms fed creep feed in the 7 days before weaning, with weaning happening between 21 and 28 days. Close to 30% of farms started creep feeding in the first 14 days of lactation.

Standard round creep feeder provided to piglets in a farrowing crate.

Potential benefits of creep feed

- introduction of piglets to solid feed prior to weaning
- development of enzymes in the piglets' gut for nutrients not found in milk
- provision of supplementary nutrition.

When you hand feed milk replacer to piglets, they will grow bigger than piglets drinking milk from the sow. This means that sows don't provide enough milk to fulfill the piglets' full growth potential, especially in large litters. The protein to energy ratio in sow milk is lower than needed to maximize piglet growth. Providing additional feed during the lactation period could increase weight gain before weaning, resulting in bigger pigs at weaning. Feeding a liquid-diet during lactation provides the highest potential for improving dry matter intake and growth rates of suckling pigs. However, cost and management problems associated with the delivery of liquid diets is a major constraint for widespread application in commercial production systems. Providing dry diets (creep feed) to piglets during lactation helps piglets adapt to solid feed before weaning, setting up their digestive tract to start making enzymes for nutrients in solid feed.

Potential challenges with creep feed

The problem is that all these benefits can only happen if piglets eat the creep feed. Research trials consistently show that less than 60% of the piglets in a litter will eat creep feed, with some farms showing only 20% of piglets consuming creep feed. This might be the reason why many research trials don't find any benefits of providing creep feed. On top of that, creep feed is the most expensive diet used in pig production, costing between $600 and $1,800 per tonne. The economic feasibility of creep feeding depends on feed costs and the potential return on investment. If the cost of creep feed exceeds the potential benefits gained from increased weaning weights and growth rates, it may not be justified. This handbook will focus on different aspects of creep feeding and will help producers answer the question: "Should I use creep feeding in my barn, and if so, how can I reduce the cost?"

POTENTIAL BENEFITS OF CREEP FEEDING

Many research trials have been done in Canada, USA, Europe and elsewhere looking at effects of creep feeding on different aspects of pork production. What does the literature say?

Sow performance

Creep feeding does not seem to affect sow performance in when piglets are weaned at 21 days of age. The amount of creep feed consumed by piglets at this age is simply too small to affect the amount of milk the piglets drink from the sow. The impact of creep feeding on sows' metabolic state (body weight and back fat thickness) might be greater with older weaning ages, but little is known about this effect. In most cases, it seems like piglets don't reduce their milk intake when they start eating creep feed but rather eat the creep feed in addition to their standard milk intake.

Creep feeding does not seem to affect sow body weight or back fat thickness

Piglet behaviour

Providing creep feed in the farrowing room does not seem to affect piglet behaviours before weaning. A trial at PSC, has shown that piglets weaned at 28 days and provided creep feed pre-weaning have less feeder approaches in the nursery room on day 0, 1 and 4 post-weaning. A Dutch study (Middelkoop et al. 2020) showed that creep feeding enhanced feed exploration two weeks post-weaning but did not affect other post-weaning behaviors.

Piglet performance

Research assessing the value of creep feeding for piglets has shown highly variable results. A recent meta-analysis (Muro et al., 2023) recorded that 46% of evaluated studies showed a positive effect of creep feeding on pre-weaning performance, whereas in 54% of studies no effect was found. The response to creep feeding prior to weaning may be dependent on weaning age. Generally, the older piglets are at weaning, the more beneficial creep feeding becomes. This is partially because older piglets have a higher nutritional demand than milk from sows can provide, and partially because older piglets have a more mature digestive system.

Creep feed has been shown to increase the weaning weight of piglets when weaned at 4 weeks of age or older. It is therefore recommended to provide creep feed if you wean at 28 days or older. When piglets are weaned at an earlier age, creep feed generally does not improve weaning weight but can have impacts on the piglets post-weaning. In 58% of the studies included in the meta-analysis, creep feeding improved piglet performance during the nursery phase. In most cases, creep feeding increased feed intake in the first days after weaning and/or improved growth rates during this time. However, most studies didn't follow the pigs till the end of the nursery. Several of the trials performed at the Prairie Swine Centre have shown there is no effect of creep feeding by the end of the nursery period. The few studies in the meta-analysis that followed pigs into the grow-finish phase did not show any effect of creep feeding on growth rate, feed intake or body weight in this phase of production.

With most producers getting paid at time of slaughter, it begs the question what, if any, economic benefits the creep feeding provides? One study followed pigs to slaughter reporting no differences in dressed weight or backfat but increased lean yield for pigs that received creep feed prior to weaning. Depending on the packer's grid and the magnitude of the change in lean yield caused by creep feeding, this may or may not result in a change to index and cracass value.

Piglet physiology

A recent trial at PSC looked at the effect of creep feeding on the blood iron status of piglets and did not find that creep feeding helped reduce anemia in piglets.

Creep feed also doesn't seem to have a significant impact on immune system activation.

Several studies have looked at effects of creep feeding on aspects of the digestive system around weaning time and found the following:

- No effect on lactobacilli or E. coli concentrations, nor short-chain fatty acid concentrations in the gut.
- No effect on gut mucosal structure and function at weaning.
- No effect on gut morphology.
- Most studies find no effect on specific microbial populations or fermentative byproducts in the small intestine of young pigs. However, a correlation exists between time piglets spend with their heads in the creep feed trough and microbiota colonisation.

With these parameters being largely unaffected by creep feeding, it is perhaps not too surprising that most studies have shown that creep feeding does not affect the prevalence, duration or severity of post-weaning diarrhea, nor the faecal shedding of haemolytic E. coli at this time.

While most studies report no effects of creep feeding on gut development at weaning, a few studies have reported subtle beneficial effects on gut morphology, cell proliferation and net absorption in the small intestine post-weaning. The effects of creep feed on gut (microbiota) development likely depend on age at provision, dietary and nutrient composition, and intake level.

Overall, provision of creep feed provides no or only minor benefits to piglets' physiology, especially when pigs are provided a high-complexity diet after weaning.

WHO IS EATING THE CREEP FEED?

Not all piglets in a litter will eat creep feed. Only 10-45% of piglets in a litter consume creep feed ("eaters") when they are weaned at 21 days. This number may increase to ~70% when pigs are weaned at 28 days. It's mostly the piglets that are not receiving enough milk from the mother who explore the creep feed and eat it. For example, litters from heat-stressed sows have higher creep feed consumption than litters from sows that are not heat stressed. Creep feeding might therefore be a good practice in hot summer months. Within litters, it's generally the smaller pigs that obtain poorer teats on the sow, which means they receive less milk. These light-weight pigs are therefore more likely to consume and benefit from creep feed. As a result, within-litter variability in body weight may be reduced when feeding creep feed, as shown in a European study where within-pen coefficient of variation in body weight at 14 days post-weaning was lower in piglets fed creep vs. those that had not received creep feed (Middelkoop et al., 2020).

Older trials at PSC found that pigs that are considered creep feed "eaters" had lower evidence of consuming the phase 1 diet 48 hours after weaning than the creep feed "non-eaters". A newer trial at PSC found the opposite; of the 37% of piglets designated as creep "eaters", 54% of these were also "eaters" of the phase 1 diet within the first 24 hours post weaning, whereas this percentage was only 44% for creep "non-eaters".

Sometimes, creep feed "eaters" may have improved pre-weaning growth rates and weaning weights, rather depends on the duration of creep feed provision and amount of creep feed consumed. Often smaller piglets in a litter that eat the creep and these piglets would naturally have a lower growth rate and weaning weight. A lack of difference in pre-weaning growth rate and weaning weight between creep feed "eaters" and "non-eaters" doesn't necessarily mean that the creep feed is not working. Instead, it could mean that the smaller piglets are now able to reach the same growth rate and weaning weight as the bigger piglets in the litter thanks to the additional nutrients from the creep feed.

The literature agrees more on the effects of eater status ("eaters" vs. "non-eaters") on growth performance postweaning. In most cases, piglets that consume the creep feed ("eaters") have improved performance in the days or weeks after weaning, sometimes until the end of the nursery. The results are better when piglets are classified as 'good eaters' vs. 'bad eaters' of creep feed. A PSC study showed a 10% improvement in average daily gain (ADG) and feed conversion efficiency in the nursery when piglets consumed creep feed in the farrowing room, compared to piglets that did not consume creep feed.

It is important for producers to find ways to increase creep-feed consumption (both the amount per piglet and number of "eaters") in the farrowing rooms. We will discuss several aspects of creep feeding management that may affect creep feed intake.

FACTORS AFFECTING CREEP FEED CONSUMPTION

Weaning age

Creep feed is more likely to be consumed in piglets weaned at a later age (28 days). A PSC study showed that only 4% of pigs weaned at 3 weeks had evidence of having consumed creep feed and 34% of pigs weaned at 4 weeks. In another PSC trial, the number of "eaters" went up from approximately 32% for pigs weaned on day 21 to 69% for pigs weaned on day 28. Older piglets have a more mature digestive system, so they are better able to digest nutrients in solid feed. Older piglets also have higher nutritional requirements than younger piglets, and sows are starting to reduce milk output, so providing additional nutrients through creep feed during this time is recommended for pigs weaned later than 25 days of age.

Creep feeding duration

If you're interested in improvements in pre-weaning performance, you'll need to provide creep feed for at least 14 days. Keep in mind that if you wean at 21 days of age, this means giving creep feed when piglets are only 7 days old, when they have very immature digestive systems. Chances are that most of the creep feed will be spilled rather than consumed at this time. For this reason, it's not practical to aim for pre-weaning performance improvements when weaning at 21 days of age. Providing creep feed for 13 days does increase the proportion of eaters in a litter by 10% compared to six and two days (80, 70, and 71% eaters, respectively). This means that the additional 7 to 11 days of creep feeding generates only 1 more eater per litter if litters have at least 10 piglets. The benefit of providing creep feed for long periods should be weighed based on the economic value of creating more eaters in whole litters.

If you're more interested in improving post-weaning performance, such as getting pigs to eat the nursery diets sooner, reducing the growth lag and improving growth rates in the nursery phase, then 3 to 7 days of creep feeding seems to be enough to attain these results.

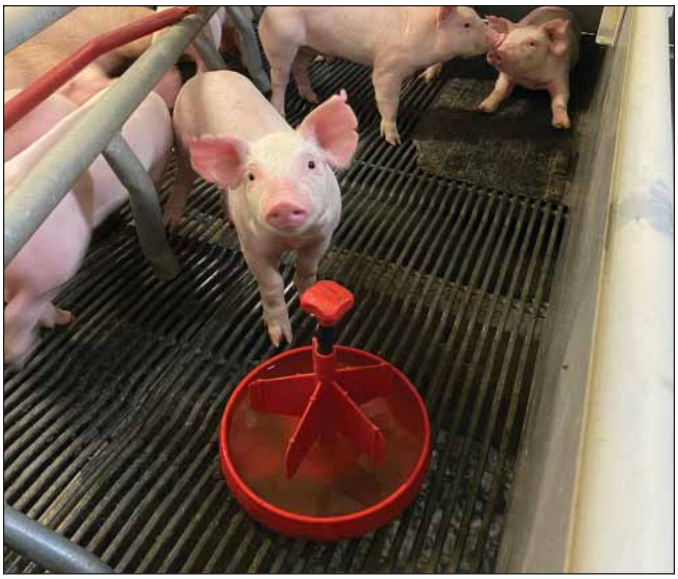
Feeder access

Increasing access to the creep feed has the most consistent effect in increasing creep feed consumption. Increasing access from two to six or eight feeding spaces per litter has shown to increase creep feed consumption and to reduce the number of pigs that consume very little in the last 24 hours before weaning. When you do your daily farrowing room checks, see if there is any aggression around the creep feeder, or if piglets are trying to get to the creep feeder unsuccessfully. These are signs that your creep feeder does not provide enough access to the piglets.

Feeder location

Putting the creep feeder in the front of the crate, close to the sow's head increases the piglets interaction with creep feed. There might be some synchronized eating with the sow happening this way. This is an easy way to increase creep feed interaction without having to spend any extra time or money. Placing the creep feeder away from the back end of the sow also helps reduce fecal and/or urinary contamination.

This creep feeder is placed near the front of the crate, which is good, but it only provides access to one or two piglets at a time



This creep feeder provides 5 feeder spaces, but it is placed near the hind end of the sow, increasing the chance of fecal and/or urinary contamination.

Feeder design

The design of the feeder may also play a role in creep feed consumption. Piglets visit a tray feeder (a baking sheet secured to the farrowing crate floor, see picture) more often than a standard round feeder, creating more "eaters" per litter. The tray feeder doesn't seem to increase synchronization of feeding as hoped. In a PSC trial, feed disappearance was higher with the tray feeder, but the growth rate was better for the standard feeder, suggesting that there was more feed wastage with the tray feeder. Tray feeders may allow some piglets to root, lie, and push feed out of the feeder which contributes to feed waste. On the other hand, groups that received a tray feeder did not lose weight in the first 24 hours after weaning, while those with standard feeders did. There were no differences in treatment between the growth rates for any other time period. In another PSC trial, more than 50% of piglets were utilizing tray feeders, compared to less than 40% with the standard feeder. Despite this, feeder type had no effect on the growth performance of piglets prior to weaning, immediately post weaning, or in the nursery period.

K-State research compared a tray feeder, a standard round feeder, and a standard round feeder with a hopper (Sulabo et al., 2010a). Feeder type did not impact pre-weaning growth but piglets that received creep from a rotary feeder with hopper had reduced feed disappearance and increased number of "eaters" compared to the tray feeder or round feeder without hopper. Another advantage of the round feeder with hopper is that it only needed to be filled once every 12 hours, which was less often than the other types of feeders. This also indicates that workers getting piglets up while filling feeders does not encourage pigs to consume more feed.

In summary, while tray feeders result in more feeder visits and "eaters", it also results in the highest feed waste. Considering the high cost of complex creep feed, a round feeder with hopper seems the best way to go to minimize feed wastage.

Play feeder for piglets used by Middelkoop et al. 2019

Piglets are eating creep feed from a tray feeder (a baking sheet secured to the farrowing crate floor, left) or a round feeder (right)

Play feeder

A play feeder is a standard creep feeder with enrichments such as pieces of rope or burlap attached to it. This type of feeder may develop a positive association between (the smell of) solid feed and object play. In a European study (Middelkoop et al., 2019), the play-feeder did not improve creep feed intake of piglets, but it stimulated feeder exploration before weaning and had a broad beneficial effect in the 15 days after weaning. Post-weaning feed intake and growth rate of piglets provided with the play feeder were improved by 15%, resulting in a 5% higher weight at day 15 post-weaning. The play-feeder also reduced the prevalence (by 44%), duration (by 1.3 days) and severity (by halving the faecal condition score) of diarrhoea, and decreased the number of body lesions by 35% post-weaning. They mixed some of the nursery feed into the creep feed for two days before weaning which may have helped the piglets get familiarized with the nursery feed. This may also have contributed to the positive results seen post-weaning. Nonetheless, considering how cheap rope is and how little you need to create a play feeder, this can be an easy applicable enrichment and feeding strategy to reduce weaning stress and improve the health, welfare and productivity of piglets around weaning.

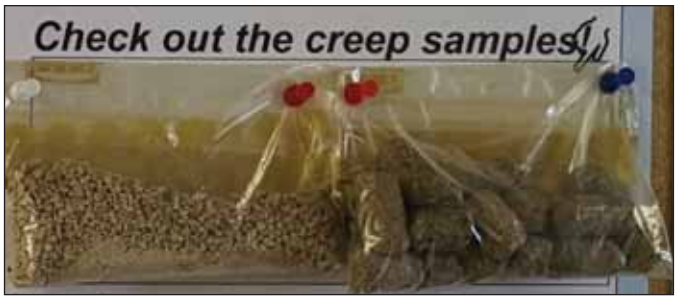
Round creep feeder with hopper (Rotecna Mini Hopper Pan; Rotecna SA, Spain) used by Sulabo et al. 2010a

Feed form and pellet size

Liquid-diet feeding during lactation provides the most potential for improving dry matter intake and growth rates of piglets, but the cost and management problems associated with the delivery of liquid diets remains a major constraint for widespread application in commercial production systems. That's why providing a dry diet (creep feed) to piglets during lactation continues to be the most popular method. Creep feed can be presented in different forms, including mash, crumbles, small pellets or large pellets. Research has shown that pelleting creep feed significantly reduces wastage and can improve intakes. The size of the pellets can also have an impact on creep feed disappearance. Standard pellet size is generally around 2 to 3 mm in diameter. However, piglets seem to prefer a larger pellet size diameter of around 12 mm.

In a series of Dutch experiments (van den Brand, 2014), piglets were given a choice of small (2-3 mm) or large (10-12 mm) pellet size creep feed. The piglets preferred the larger diameter pellet, as evidenced by a higher intake of large pellets of 350 g/litter/day compared to small pellets. When litters were offered only one option (either small or large pellet size), creep feed intake was 650 g/day higher in litters offered large pellets. Piglets given large pellets before weaning had higher body weight gain and feed intake post-weaning, and did not experience a post-weaning growth lag. Other trials (from K-state University and OMAFRA) have also shown improved growth performance in (part of) the nursery period when feeding large pellet creep feed in lactation vs. small pellets. Additionally, feeding a large pellet diameter has been reported to reduce pre-weaning mortality (Clark et al., 2015) and post-weaning mortality (Wensley et al., 2021).

Piglets spend time exploring and playing with the large pellets in the farrowing crates. As a form of enrichment, the large pellets allow piglets to learn to consume feed in a social setting. Because the piglets like to pick up the pellets and play with them before eating them, it is important to make sure that the slat size of the farrowing crate floor will not let the pellets fall through. For the same reason, it may be best to switch to a mini-sized pellet or mash (of the same feed formulation) at weaning to help prevent feed loss through the slats of the nursery pens.



Samples of creep feed with two different pellet sizes (left - standard; right - large) used in a trial at PSC by Kallal et al. 2024

Flavours

It is recommended to provide the same feed pre-weaning and immediately post-weaning so piglets are familiar with the feed. Maintaining the same feed pre- and post-weaning helps piglets cope with the stress of weaning. The flavour of the feed plays a part in the piglet's recognition of the feed. One trial showed that pigs exposed to flavoured creep feed tended to have improved feed intake immediately post-weaning and increased gain when fed complex starter diets supplemented with the same flavour (Sulabo et al., 2010d). Specific feed flavours are often added in nursery diets to improve diet acceptance and stimulate intake. Limited research exists looking at adding flavours to creep feed, but generally it seems like adding flavours to creep feed does not influence total creep intake or the proportion of eaters, nor growth performance after weaning. The lack of effect of flavours in suckling piglets suggests age-related differences or greater individual variation in palatability perception.

Nutritional aspects (Complex vs. simple diets)

Creep feed usually consists of highly digestible ingredients such as whey, skim milk, fish meal, etc. which are easier for the young piglets to digest relative to plant-based ingredients. However, those animal-derived ingredients are also very expensive, making creep feed the most expensive diet used in pig production. Identification of less expensive alternatives would help to reduce production costs. Some of the benefits of providing creep feed is related to enhancing exploratory behaviour in piglets (i.e., allowing natural rooting behaviours) and exposure to feed in a dry form, rather than provision of nutrients. That's why some research at PSC and elsewhere has looked at providing a simple diet based on plant-based ingredients, such as a standard sow lactation diet. The PSC trial showed that piglets had no preference for simple or complex creep feed, as evidenced by similar feed intake pre-weaning.

Creep feeding had little impact on pre-weaning performance, except an overall trend for improved weight gain in the last week pre-weaning (on day 28) in litters receiving simple or simple/complex creep. There was no effect of creep feed type (simple vs. complex, or a mix of the two) on post-weaning performance. On the other hand, research from K-state showed that providing a complex diet vs. a lactation diet created more "eaters" in a litter (68% vs. 28%, respectively), and litters fed the complex creep diet consumed twice the total and daily creep feed intake of litters fed the lactation creep diet. As a result, pigs fed the complex creep diet had 13% greater daily gains and 11% greater total gain than pigs fed the simple creep diet. Several research institutions have shown that pigs who received more complex creep feed during lactation ate more pre-weaning and continued to eat more post-weaning, and that they exhibited reduced body weight loss immediately after weaning compared to pigs fed a low complexity creep feed. Furthermore, pigs fed high complexity creep feed had improved growth performance in the post-weaning period compared with those that had received a simple creep feed diet. Overall, it seems that creep feed complexity has the greatest influence in creating eaters relative to all the non-dietary and dietary factors previously mentioned. This indicates that creep feed diets containing high amounts of milk- and other specialty-protein sources will offer the greatest advantage of increasing the percentage of eaters and total creep feed intake.

Transition diet

In order for creep feed to improve post-weaning performance, it is important that the creep feed and post-weaning diet are similar. If there are large differences between the composition of creep feed and the post-weaning diet, piglets may not adjust to the post-weaning diet well, even if they ate the creep feed. The similarity between the composition of creep feed and the diet immediately post-weaning is in fact more important to post-weaning performance than the intake level of solid feed in the pre-weaning stage. It is therefore important to provide the same diet in the pre-weaning period (at least in the last week/days) and the initial post-weaning period, so that piglets will recognise the post-weaning diet in terms of both behaviour (e.g., reduced food neophobia) and physiology. If you provide creep feed for less than 7 days in total, the easiest would be to just provide the nursery phase 1 diet as creep feed, rather than buying a highly specialized creep feed, which you would then need to blend with the nursery phase 1 diet for a few days to help ease the transition.

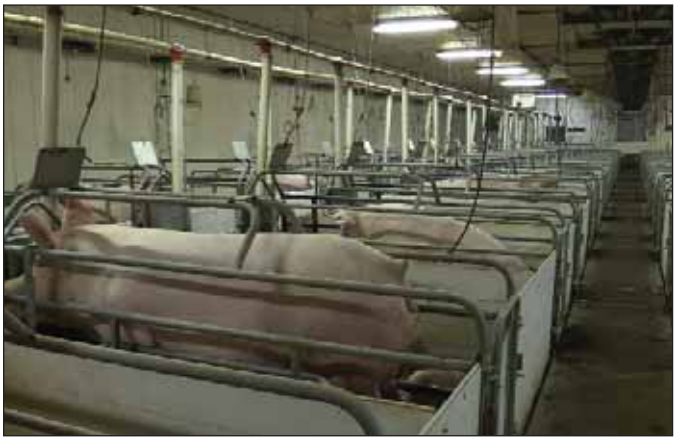
It is important to provide the same diet in the pre-weaning period (at least in the last week/days) and the initial post-weaning period

MAKING CHANGES ON YOUR FARM

Are you creep feeding without being sure if the practice is having any benefits on your farm? As mentioned before, about half of the research trials don't find any effects of creep feeding on pre- or post-weaning growth performance. If you are considering to stop creep feeding, start by removing the creep feed in one farrowing room. You can then compare things like mortality rate, medical treatments, days to slaughter, and carcass revenue between the pigs from this farrowing room and the pigs from other farrowing rooms. If you don't see any clear differences, your creep feed may not be doing anything in which case you're wasting money. You can then remove the creep feed from more farrowing rooms and try this for a while.

Another option is to make changes to the way you provide creep feed. Based on the factors affecting creep feed intake mentioned above, you may want to try changing the type or location of the creep feeder, or the type or pellet size of the creep feed. Before making any changes to your creep feeding protocols on farm, it is important to conduct a test at your own facility to set a "benchmark" of current creep feed intakes. This will allow you to gauge whether the implemented changes encourage more creep intake or hinder consumption. For benchmarking to work, decide what to measure and how to measure it. The best strategy is to measure total creep consumption in a litter and determine the proportion of piglets consuming creep within a litter.

The following paragraphs are taken (with permission from the author) from a factsheet written by Laura Eastwood for the Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA factsheet 18-003, Agdex 440/51, January 2018) describing how to measure creep consumption and how to determine which piglets in a litter are "eaters" of creep feed.



If you are considering to stop creep feeding, start by removing the creep feed in one farrowing room.

Measuring creep consumption

Measuring creep consumption on a litter basis is relatively easy. The box below shows a sample tracking sheet. Values are for example purposes only and would have to be recorded each time feed is added or removed (not just once per day).

Weigh the amount of creep feed placed in a farrowing crate (using a weigh scale or calibrated feed scoop). Then measure the remaining feed after a given time period. The difference is the total intake (disappearance) for that litter during that time period. Dividing total intake by the number of piglets and the number of days provides the average daily creep feed intake per piglet. Perform these measurements and calculations for several crates to get a representative average value for your barn.

CREEP FEED INTAKE TRACKING SHEET EXAMPLE

Sow ID: _____

pigs nursing during creep feeding period: 12

Date creep added: _____

Weaning date: _____

Date	Amount of creep added	Amount of creep removed
day 1	100 g	75 g
day 2	100 g	25 g
day 3	200 g	50 g
day 4	250 g	50 g
day 5	250 g	25 g
day 6	300 g	25 g
day 7	350 g	15 g
Totals:	**1,550 g**	**265 g**

Creep intake per litter (total added - total removed)
= 1,550 g - 265 g
= 1,285 g/litter

Avg. creep intake per piglet (intake per litter /# piglets)
= 1,285/12
= 107 g per piglet

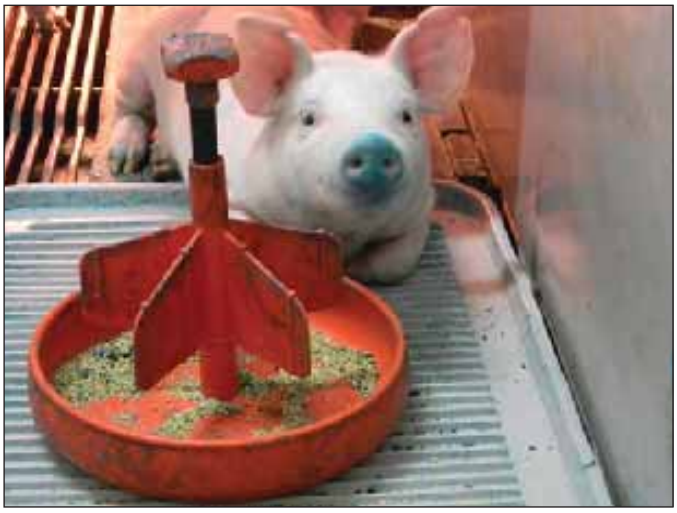
Avg. daily intake per piglet (avg. intake per piglet/ days)
= 107/7
= 15 g per piglet per day

Determining how many pigs eat creep feed?

Determining the proportion of piglets consuming creep feed in a litter is more difficult. However, it will provide valuable information and allow you to understand exactly what proportion of your piglets actually consume creep feed pre-weaning. This method does not determine the amount each individual piglet consumes; it simply classifies a piglet as an "eater" or a "non-eater."

The first step in this method is to make simple biscuits containing an indigestible dye such as ferric oxide (red) or brilliant blue (blue). The dyes can be purchased from a laboratory supply store. Both of these dyes can be fed to food-producing animals without concern. When the dyed biscuits are consumed, the feces will turn the respective colour.

Mix the biscuits with the creep feed at a 5% inclusion level (50 g biscuits per 1 kg creep feed). As piglets consume the creep feed, they will also consume the dye biscuits, and the dye colour will appear on their noses (see picture).



A pig with a blue nose from consuming dye biscuits mixed in with the creep feed

It will take approximately 24 hours after consumption for the dye colour to appear in feces. Cotton swabs can be used to swab the piglet's anus and get a clear reading for individual piglets. If the swab is the colour of the dye, the piglet is classed as a creep eater. If no dye is present in the feces, the piglet is classed as a non-eater.

It will take approximately 24 hour after consumption for the dye colour to appear in feces. Cotton swabs can be used to swab the piglet's anus and get a clear reading for individual piglets. If the swab is the colour of the dye, the piglet is classed as a creep eater. If no dye is present in the feces, the piglet is classed as a non-eater.

"Once you know how much creep feed is consumed per piglet (or litter) and/or the proportion of piglets within a litter that consume creep feed, you are ready to make creep-feeding protocol changes in your barn."

DYE BISCUIT RECIPE

- Preheat oven to 120 °C.
- Break 2 eggs into a bowl and mix.
- Mix in 40 g dye and 60 ml (0.25 cups) milk.
- Gradually stir in 475 mL (2 cups) of flour.
- If needed, add additional milk in small amounts.
- Spread dough 1.2 cm (~0.5 in. thick) onto a cookie sheet.
- Bake 1 - 1.5 hr, let cool until hard.
- Break large biscuit into small or medium-sized pieces and blend using pulse mode to make pellet-sized crumbles.
- Store in an airtight container.

You will then know the proportion of creep feed eaters and non-eaters within a litter and can obtain an average for the farrowing group. For example, if there are 12 piglets nursing a given sow and 3 piglets have dyed feces, 3/12 = 0.25 or 25% of the litter consumed creep feed

Once you know how much creep feed is consumed per piglet (or litter) and/or the proportion of piglets within a litter that consume creep feed, you are ready to make creep-feeding protocol changes in your barn. Over time, you will be able to re-evaluate the creep consumption and/or number of piglets consuming creep feed. This will enable you to determine if the new feeding strategy has improved creep feed intake on your farm.

CONCLUSION

The benefits of creep feeding are not clear cut. Whether it makes economic sense to provide creep feed on your farm depends on how many piglets actually eat it, and if the creep feed provides long-lasting improvements in growth performance and health status.

Based on the information provided in this handbook, we recommend the following best management practices:

- If you're weaning day 21 of age, consider not giving any creep feed. If you do prefer to use creep feed, provide the nursery phase 1 diet for 3 to 7 days before weaning rather than buying a special creep feed. Ask your feel mill to create larger pellets (~12 mm) rather than the standard pellet size (~3 mm).
- If you're weaning at 28 days of age, do provide creep feed for at least 5 to 7 days (the nursery phase 1 diet with larger pellet size would be ideal here), or consider feeding a special creep feed with highly digestible protein sources for at least 14 days and blend in the nursery phase 1 diet in the last couple of days. Again, ask your feed mill to create a larger pellet size (~12 mm) for the creep feed.

Regardless of weaning age, we recommend:

- To provide 5 to 8 feeder spaces per litter to increase the interaction of piglets with the creep feed.
- To use a round feeder with hopper in order to minimize feed waste.
- To add little pieces of rope, cardboard or burlap to the feeder to create a 'play feeder'.
- To place the creep feeder in the front of the pen, near the sow's head, to reduce fecal and urinary contamination as well as to stimulate synchronized feeding with the sow.

Make sure to measure the total creep consumption in a litter and/or determine the proportion of piglets consuming creep within a litter both before and after you implement any changes, so you have an idea if the changes are having the desired effect. Also make sure to take the economics of creep feeding into account in your decision whether to provide creep feed or not, and whether it makes sense to make any changes to your creep feeding protocols.

REFERENCES AND FURTHER READING

PRAIRIE SWINE CENTRE

- Beaulieu, Shea, and Gillis, 2010. Weaning at 28 days; Is creep feeding beneficial? (https://www.prairieswinecentre.com/2020/11/20/weaning-at-28-days-is-creep-feeding-beneficial-2/ and https://www.prairieswinecentre.com/2020/11/20/weaning-at-28-days-is-creep-feeding-beneficial/)
- Bandara, Shea, Gillis, and Beaulieu. 2011. Creep feed provision in the farrowing room provides benefits to piglets showing evidence of intake. (https://www.prairieswine.com/2020/11/23/creep-feed-provision-in-the-farrowing-room-provides-benefits-to-piglets-showing-evidence-of-intake/)
- Beaulieu and Shea. 2012. The overall response of piglets to phase one diets during the first two weeks in the nursery is not affected by creep feeding or weaning weight (https://www.prairieswine.com/2020/11/03/the-overall-response-of-piglets-to-phase-one-diets-during-the-first-two-weeks-in-the-nursery-is-not-affected-by-creep-feeding-or-weaning-weight/)
- Shea, Beaulieu, Gillis, and Brown 2012-13. Do creep feeding outcomes depend on weaning age? (https://www.prairieswine.com/2019/09/03/creep-feeding-in-the-farrowing-room-do-the-outcomes-depend-on-weaning-age/)
- Gauvreau and Beaulieu 2013-14. Are my pigs eating? (https://www.prairieswine.com/2019/02/25/are-my-pigs-eating/)
- Seddon and Brown. 2013-2014. Increasing creep feed intake by stimulating exploratory behaviour using enrichment. (https://www.prairieswine.com/2020/11/23/increasing-creep-feed-intake-by-stimulating-exploratory-behaviour-using-enrichment/)
- Seddon, Fairbrother, Davies, Bouvier, Brown. 2014. Stimulating exploratory behaviour in piglets: effects on pre-weaning creep consumption. (https://www.prairieswine.com/2020/11/04/stimulating-exploratory-behaviour-in-piglets-effects-on-pre-weaning-creep-consumption/)
- Seddon, Davis, Bouvier, Brown. 2014-2015. Stimulating exploratory behaviour in piglets: effects on pre-weaning creep consumption. (https://www.prairieswine.com/2019/02/19/stimulating-exploratory-behaviour-effect-on-creep-consumption/)
- Seddon, Bouvier, Brown. 2015-2016. Stimulating exploratory behavior in piglets: effects on pre-weaning creep consumption. (https://www.prairieswine.com/2020/11/23/stimulating-exploratory-behavior-in-piglets-effects-on-pre-weaning-creep-consumption/)
- Seddon, Beaulieu, Brown. 2016. Getting more piglets interested in creep feed. (https://www.prairieswine.com/2020/11/03/getting-more-piglets-interested-in-creep-feed/)
- Brown and Seddon. 2016. Using exploratory behaviour to increase pre-weaning creep consumption. (https://www.prairieswine.com/2020/11/04/using-exploratory-behaviour-to-increase-pre-weaning-creep-consumption/)
- Agyekum, Brown, Beaulieu, Seddon. 2017. Using creep feeding as a strategy to improve post weaning feed intake and piglet growth. (https://www.prairieswine.com/2020/11/04/using-creep-feeding-as-a-strategy-to-improve-post-weaning-feed-intake-and-piglet-growth/)
- Engele. 2018. Farrowing systems Auditing BMPs – Part 5. (https://www.prairieswine.com/2020/11/06/farrowing-systems-auditing-best-management-practices/)
- Sands and Columbus. 2021. Creep feed source: what is effective and what do piglets prefer? (https://www.prairieswine.com/2023/05/05/creep-feed-source-what-is-effective-and-what-do-piglets-prefer/)
- Columbus and White. 2021. Does creep feed have any benefits? (https://www.prairieswine.com/2023/05/09/does-creep-feed-have-any-benefits/)
- Sands, J.M., Rodrigues, L.A., Wellington, M.O., Panisson, J.C. and Columbus, D.A. 2022. Pre- and post-weaning performance of piglets offered different types of creep feed. Can. J. Anim. Sci. 102: 189-193. https://doi.org/10.1139/cjas-2021-0038.
- Engele. 2024. A survey of BMPs of swine farms across Canada – Part 2. (https://www.prairieswine.com/2024/08/13/a-survey-of-best-management-practices-of-swine-farms-across-canada-part-2/)
- Kallal, Tillotson, Chou, Brown. 2024. The effect of standard and large pellet creep feed on blood iron parameters on weaned pigs. Poster presented at the Sask Pork Symposium in Saskatoon, November 2024.

OTHER CANADIAN RESEARCH

- Eastwood, L. 2018. Creep feeding to improve piglet performance. OMAFRA factsheet 18-003, Agdex 440/51, January 2018. https://files.ontario.ca/omafra-creep-feeding-to-improve-piglet-performance-18-003-en-2022-01-27.pdf.
- Christensen, B. and Huber L-A. 2021. The effect of creep composition and form on pre- and post-weaning growth performance of pigs and the utilization of low-complexity nursery diets. Transl. Anim. Sci. 2021.5:1-14. https://doi.org/10.1093/tas/txab211.

WAGENINGEN UNIVERSITY AND SCHOTHORST FEED RESEARCH

- Van den Brand, H., Wamsteeker, D., Oostindjer, M., van Enckevort, L. C. M., van der Poel, A. F. B., Kemp, B. and Bolhuis, J. E. 2014. Effects of pellet diameter during and after lactation on feed intake of piglets pre- and postweaning. J. Anim. Sci. 9 2:4145–4153. https://doi.org/10.2527/jas2014-7408.
- Middelkoop, A., Costermans, N., Kemp, B., and Bolhuis, J.E. 2019. Feed intake of the sow and playful creep feeding of piglets influence piglet behaviour and performance before and after weaning. Sci. Rep. 9: 1–13. https://doi.org/10.1038/s41598-019-52530-w.
- Middelkoop, A., Choudhury, R., Gerrits, W.J.J., Kemp, B., Kleerebezem, M., and Bolhuis, J.E. 2020. Effects of creep feed provision on behavior and performance of piglets around weaning. Front. Vet. Sci. 7: 520035. https://doi.org/10.3389/fvets.2020.520035.
- Huting, A.M.S., Middelkoop, A., Guan, X. and Molist, F. 2021. Using nutritional strategies to shape the gastro-intestinal tracts of suckling and weaned piglets. Animals 11, 402. https://doi.org/10.3390/ani11020402.

OTHER RESEARCH

- Muro, B.D., Carnevale, R.F., Monteiro, M.S., Yao, R., Ferreira, F.N.A., Neta, C.S.S., Pereira, F.A., Maes, D., Janssens, G.P.J., Almond, G.W., Garbossa, C.A.P., Watanabe, T.T.N. and Leal, D.F. 2023. A systematic review and meta-analysis of creep feeding effects on piglet pre- and post-weaning performance. Animals 13: 2156. https://doi.org/10.3390/ani13132156.

KANSAS STATE UNIVERSITY

- Sulabo, R.C., Jacela, J.Y., Tokach, M.D., Dritz, S.S., Goodband, R.D.k DeRouchey, J.M. and Nelssen, J.L. 2010a. Effects of lactation feed intake and creep feeding onsow and piglet performance. Journal of Animal Science 88: 3145-3153. https://doi.org/10.2527/jas.2009-2131.
- Sulabo, R.C., Tokach, M.D., Dritz, S.S., Goodband, R.D., DeRouchey, J.M. and Nelssen, J.L. 2010b. Effects of varying creep feeding duration on pre-weaning performance and the proportion of pigs consuming creep feed. Journal of Animal Science 88: 3154-3162. https://doi.org/10.2527/jas.2009-2134.
- Sulabo, R.C., Tokach, M.D., DeRouchey, J.M., Dritz, S.S., Goodband, R.D. and Nelssen, J.L. 2010c. Effects of creep feeder design and feed accessibility on preweaning pig performance and the proportion of pigs consuming creep feed. Journal of Swine Health and Production 18: 174-181. https://www.aasv.org/shap/issues/v18n4/v18n4p174.html.
- Sulabo, R.C., Tokach, M.D., DeRouchey, J.M., Dritz, S.S., Goodband, R.D. and Nelssen, J.L. 2010d. Influence of feed flavors and nursery diet complexity on preweaning and nursery pigs performance. Journal of Animal Science 88: 3918-3926. https://doi.org/10.2527/jas.2009-2724.
- Clark, A. B.; De Jong, J. A.; DeRouchey, J. M.; Tokach, M. D.; Dritz, S. S.; Goodband, R. D.; and Woodworth, J. C. 2015. Effects of Creep Feed Pellet Diameter on Suckling and Nursery Pig Performance, Kansas Agricultural Experiment Station Research Reports: Vol. 1: Iss. 7. https://doi.org/10.4148/2378-5977.1118.
- Tokach, M.D.; Cemin, H.S.; Sulabo, R.D.; Goodband, R.D. Feeding the suckling pig: Creep feeding. 2020. In The Suckling and Weaned Piglet; Farmer, C., Ed.; Wageningen Academic Publishers: Wageningen, The Netherlands; pp. 139–157, ISBN 978-90-8686-343-3.
- Wensley, M.R., Tokach, M.D., Goodband, R.D., Gebhardt, J.T., Woodworth, J.C., DeRouchey, J.M., Allerson, M., Menegat, M., and Boeschert, A. 2021. Effect of Floor Feeding Creep Feed on the Growth Performance and Mortality of Pigs After Weaning, Kansas Agricultural Experiment Station Research Reports: Vol. 7: Iss. 11. https://doi.org/10.4148/2378-5977.8166.
- Wensley, M.R., Tokach, M.D., Woodworth, J.C., Goodband, R.D., Gebhardt, J., DeRouchey, J.M. and McKilligan, D. 2021. Maintaining continuity of nutrient intake after weaning. I. Review of pre-weaning strategies. Transl. J. Anim. Sci. 5 (1): January 2021, txab021. https://doi.org/10.1093/tas/txab021.

CHECKLIST

Tips for Successful Creep Feeding

PRAIRIE SWINE CENTRE

Placement Matters

- Place the creep feeder in the front of the pen, near the sow's head, to reduce fecal and urinary contamination as well as to stimulate synchronized feeding with the sow.

Monitor Consumption

- Track which piglets are consuming the feed and adjust strategies to encourage more piglets to eat.
- Provide 5 to 8 feeder spaces per litter to increase the interaction of piglets with the creep feed.
- Use a round feeder with hopper in order to minimize feed waste.
- Add little pieces of rope, cardboard or burlap to the feeder to create a 'play feeder'. This will increases exploration.

Keep It Fresh

- Regularly replenish the feed to maintain its appeal and prevent spoilage.
- Provide the same feed pre and post weaning.

Consistency

- Offer creep feed consistently to familiarize piglets with solid food and reduce post-weaning stress.

Three Week Weaning (21 days)

- Consider not providing creep feed.
- If you do prefer to use creep feed, provide the nursery phase 1 diet for 3 to 7 days before weaning rather than buying a special creep feed.
- Ask your feed mill to create larger pellets (12 mm) rather than the standard pellet size (3 mm).

Four Week Weaning (28 days)

- Provide creep feed for at least 5 to 7 days (nursery phase 1 diet).
- Ask your feed mill to create larger pellets (12 mm) rather than the standard pellet size (3 mm).
- Consider feeding a special creep feed with highly digestible protein sources for at least 14 days and blend in the nursery phase 1 diet in the last couple of days.

CREEP FEED INTAKE TRACKING SHEET

Sow ID: _____

pigs - creep feeding period: _____

Date creep added: _____

Weaning date: _____

Date	Amount of creep added	Amount of creep removed
day 1	g	g
day 2	g	g
day 3	g	g
day 4	g	g
day 5	g	g
day 6	g	g
day 7	g	g
Totals:	**g**	**g**

Creep intake per litter (total added - total removed)

= _____ g (added) - _____ g (removed)

= _____ g (intake/litter)

Avg. creep intake per piglet (intake per litter /# piglets)

= _____ piglets

= _____ g/piglet

Avg. daily intake per piglet (avg. intake per piglet/days)

= _____ piglets

= _____ g/piglet/day

CREEP FEED INTAKE TRACKING SHEET

Sow ID: _____

pigs - creep feeding period: _____

Date creep added: _____

Weaning date: _____

Date	Amount of creep added	Amount of creep removed
day 1	g	g
day 2	g	g
day 3	g	g
day 4	g	g
day 5	g	g
day 6	g	g
day 7	g	g
Totals:	**g**	**g**

Creep intake per litter (total added - total removed)

= _____ g (added) - _____ g (removed)

= _____ g (intake/litter)

Avg. creep intake per piglet (intake per litter /# piglets)

= _____ piglets

= _____ g/piglet

Avg. daily intake per piglet (avg. intake per piglet/days)

= _____ piglets

= _____ g/piglet/day

CREEP FEED INTAKE TRACKING SHEET

Sow ID: _____

pigs - creep feeding period: _____

Date creep added: _____

Weaning date: _____

Date	Amount of creep added	Amount of creep removed
day 1	g	g
day 2	g	g
day 3	g	g
day 4	g	g
day 5	g	g
day 6	g	g
day 7	g	g
Totals:	**g**	**g**

Creep intake per litter (total added - total removed)

= _____ g (added) - _____ g (removed)

= _____ g (intake/litter)

Avg. creep intake per piglet (intake per litter /# piglets)

= _____ piglets

= _____ g/piglet

Avg. daily intake per piglet (avg. intake per piglet/days)

= _____ piglets

= _____ g/piglet/day

CREEP FEED INTAKE TRACKING SHEET

Sow ID: _____

pigs - creep feeding period: _____

Date creep added: _____

Weaning date: _____

Date	Amount of creep added	Amount of creep removed
day 1	g	g
day 2	g	g
day 3	g	g
day 4	g	g
day 5	g	g
day 6	g	g
day 7	g	g
Totals:	**g**	**g**

Creep intake per litter (total added - total removed)

= _____ g (added) - _____ g (removed)

= _____ g (intake/litter)

Avg. creep intake per piglet (intake per litter /# piglets)

= _____ piglets

= _____ g/piglet

Avg. daily intake per piglet (avg. intake per piglet/days)

= _____ piglets

= _____ g/piglet/day

PRAIRIE SWINE CENTRE

Box 21057, 2105 8th street East
Saskatoon, Saskatchewan,
CANADA, S7H 5N9

Phone (306) 373-9922

www.prairieswine.com