

# Creep Feeding to Improve Piglet Performance

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## Factsheet

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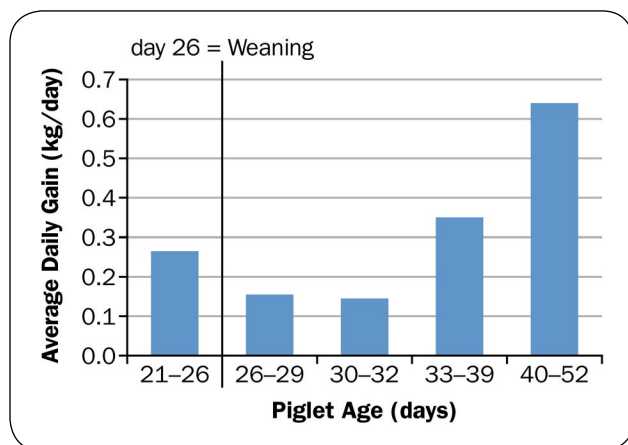
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### INTRODUCTION

Weaning is considered to be one of the most stressful events in a pig's life. They undergo social, environmental and nutritional stressors at a time when their immune system is not fully developed. These stressors work together to generate an immune response that contributes to the post-weaning growth lag (PWGL). The PWGL is characterized by piglets going off feed, reduced or negative growth rates (Figure 1) and increased susceptibility to pathogens in the first 24–48 hr post-weaning.

Many different strategies can be adopted to get piglets off to a better start, both pre-weaning (in the farrowing room) and post-weaning (in the nursery).

Pre-weaning strategies aim to give piglets a stronger start before they encounter major stressors. Post-weaning strategies may not help reduce the PWGL but will aid piglet recovery post-weaning. This factsheet discusses creep feeding, a strategy used to increase piglets' nutrient intake and familiarize them with solid food prior to weaning.



**Figure 1.** Piglet average daily gain, pre- and post-weaning, showing the PWGL (adapted from Shea et al., 2013).

### CREEP FEEDING

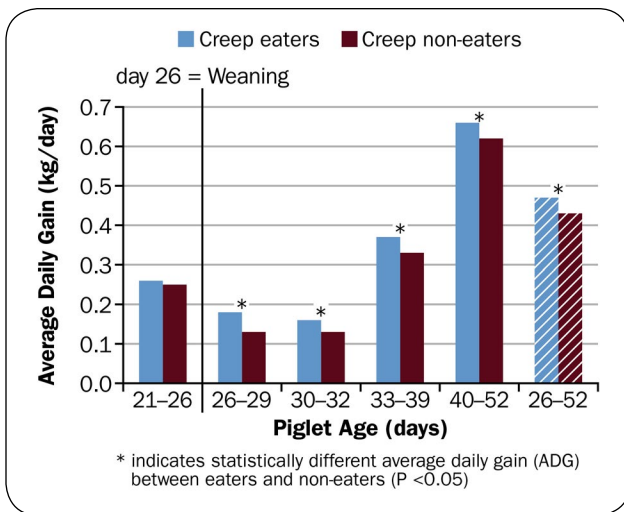
One strategy, known as creep feeding, can help reduce the PWGL by offering feed to animals while they are still nursing. Creep feed is typically composed of highly digestible ingredients and is thought to benefit piglets in several ways, including:

- introducing piglets to solid feed prior to weaning
- helping the piglets' gut adapt to nutrients not found in milk
- providing supplemental nutrition

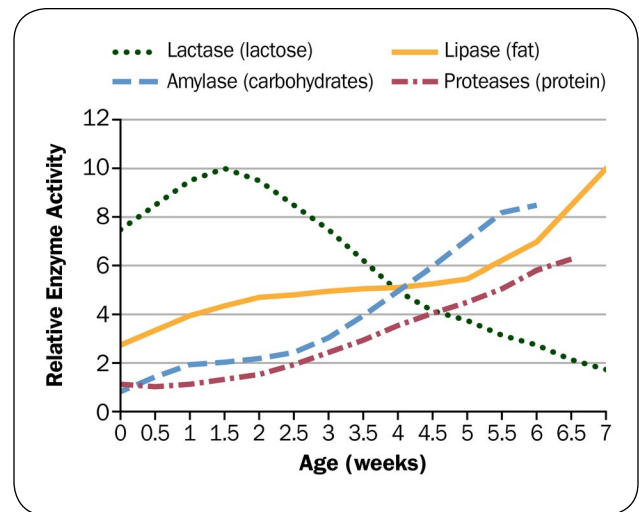
The results of research looking at the impact of creep feeding on piglet performance can be highly variable. On many occasions, creep feed has been shown to increase the weaning weights of piglets when they are weaned at 4 weeks of age or older. When piglets are weaned at an earlier age, creep feed generally does not improve weaning weight but can have significant impacts on the piglet post-weaning.

Creep-feed intake can also be highly variable within a litter, making it difficult to determine the exact impact it may be having on farm. For example, when individual piglets are tracked, some studies show that less than 40% of a litter will consume creep feed when it is offered (Bandara et al., 2011). However, the piglets that consume the creep feed have improved performance in the farrowing rooms and, subsequently, in the nursery. A Canadian 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 (Shea et al., 2013), compared to piglets that did not consume creep feed (Figure 2).

It is important for producers to find ways to increase creep-feed consumption (amount per piglet and number of piglets consuming creep feed) in the farrowing rooms. This will help get piglets off to a better start at the time of weaning.



**Figure 2.** Pre- and post-weaning average daily gains of piglets that consumed or did not consume (but were offered) creep feed in the farrowing room (adapted from Shea et al., 2013).



**Figure 3.** Digestive enzyme activity pattern in young pigs (adapted from *Swine Nutrition Guide*, 1995).

### Strategies to Improve Creep Feed Intake

To maximize creep feed intake on farm:

- offer specifically formulated creep feed made of high-quality, highly-digestible ingredients
- keep creep feeders clean and free from manure
- start creep feeding as early as 1 week post-farrowing
- feed small amounts frequently (minimum 3 times per day)
- offer feed when the sow is eating and the piglets are awake
- encourage social feeding and exploration (using tray feeders and/or changing pellet size)
- provide gruel or a liquid creep feed to higher-risk piglets (mix creep feed with milk replacer)

### Creep Feed Composition

Creep feed should be composed of highly digestible ingredients that can help encourage intake. During the first few weeks of life, the digestive enzymes required to digest starch, sugar and non-milk proteins are present at low levels. The enzymes that are present are for the digestion of milk proteins (casein), milk sugar (lactose), glucose and certain fats (Figure 3).

Ingredients such as milk products (whey, skim milk, etc.) and plasma products are not only easier for the young piglet to digest relative to plant-based ingredients, but also encourage increased intake. Small amounts of non-milk ingredients such as rolled oats or flaked corn can stimulate the development of the other digestive enzymes, priming the piglet for its transition to solid food post-weaning. Work closely with your feed company and/or nutritionist to develop a creep-feeding ration that will help optimize performance in your barn. Creep feed can be mash, crumbles, small pellets or even large pellets (Figure 4 and the section *Feed Type*). Research has shown that pelleting creep feed significantly reduces wastage and can improve intakes.



**Figure 4.** Creep feed comes in many different formats including small pellets, mash, large pellets and crumbles.

### Keeping Feeders Clean

Wash and disinfect feeders prior to being used, and keep them within the same farrowing crate, once added, to avoid potential contamination between litters.

If possible, place feeders away from the back end of the sow to help reduce fecal and/or urinary contamination. If the feeder becomes contaminated with feces or urine (from the sow or piglets) or spoiled feed, wash and dry the feeder before adding more creep feed. Raising the feeder off the ground by a few centimetres can also decrease the chance of contamination and help reduce wastage.

### Feeding Protocols

Offer creep feed a minimum of 1 week prior to piglets weaning. Offering creep feed earlier can improve intake and piglet performance. Starting creep feeding as early as 1 week post-farrowing can lead to higher intakes and more piglets consuming creep feed prior to weaning.

Creep feed should be offered in small amounts and frequently (minimum of 3 times per day). This ensures the feed is fresh and more palatable for the piglets. It will also help reduce wastage and spoilage of the feed.

It is easier to start piglets' creep feeding on a flat surface than in a designated feeder, but once piglets are consuming the feed, a feeder can be used effectively. Initially, feed no more than 50 g per litter per day, and increase the amount as piglets increase consumption. Offer creep feed when the piglets are awake, as they are curious and will inspect the feed if they see it added to the crate. A good time to offer creep feed is while the sow is up and eating; usually piglets are awake at this time and are often hungry as they wait for the sow to nurse them.

To obtain maximal creep-feed intake, ensure piglets have access to a water source in addition to their mother's milk. This will also help the piglet adapt to the use of a nipple drinker prior to weaning, which helps decrease weaning-induced stress responses.

### Social Feeding

In several research trials, social feeding has been shown to encourage exploration of the feed and increase creep feed intake in piglets pre-weaning. This translates into improved piglet growth in the nursery. Two ways to encourage social feeding in the farrowing crate are to change the feeder and/or the feed type.

### Feeder Type

Feeder styles, such as round or flat tray feeders, can affect creep-feed intake.

Piglets fed using a flat tray feeder visit the feeder more and show more social exploration compared to those fed with a standard round feeder (Seddon and Brown, 2013). In a study by Seddon and Brown (2013), piglets fed creep feed in a tray feeder showed no signs of a growth check within 24 hr post-weaning, while piglets fed using a round feeder did. The flat tray feeder was a simple baking sheet mounted to the farrowing crate floor (Figure 5). Other practical options that can be used as a tray style feeder are a heavy duty boot tray or a heating mat (without heat).



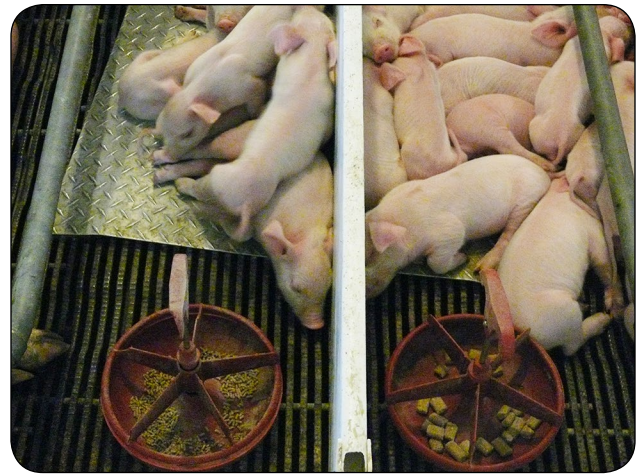
**Figure 5.** Flat tray versus a standard round style creep feeder (image courtesy of Prairie Swine Centre Inc.).

### Feed Type

Piglets raised outside seldom experience the post-weaning growth lag. Some researchers believe this is because of the ample opportunity to explore and ingest soil and plant material (such as acorns, corn and other large items), making them more familiar with the process of consuming material prior to weaning (Newberry and Wood-Gush, 1986; Edge et al., 2005). Piglets raised indoors do not get this same opportunity for novel exploration, and creep feed pellet diameter is typically small (3 mm or less).

In a series of experiments conducted in the Netherlands (van den Brand, 2014), piglets were offered creep feed with larger pellet size (10 or 12 mm) compared to a standard pellet (2–3 mm), starting within the first week post-farrowing. When given the choice of the small or large pellet, piglets preferred the larger diameter pellet. Researchers found a higher intake of large pellets compared to small pellets of 350 g/litter/day (van den Brand, 2014). 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. Additionally, 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.

In 2016, OMAFRA conducted a demonstration trial to determine if large creep pellets would show similar benefits (Figure 6). Thirty-four litters in each of two commercial barns in Ontario were tracked pre- and post-weaning.



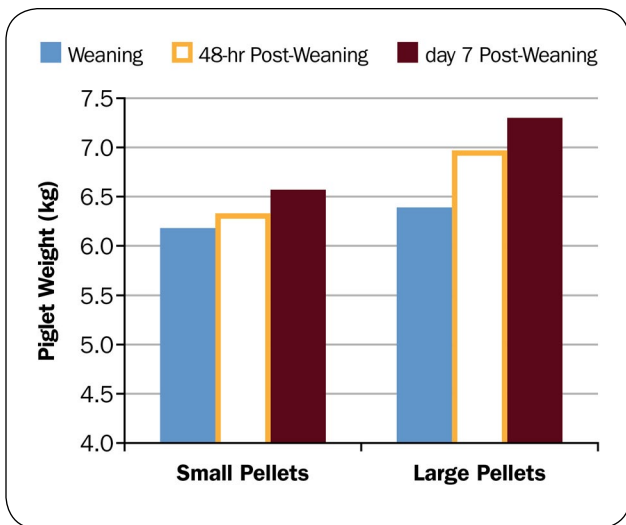
**Figure 6.** Litters received either mini pellets (~3 mm diameter) left, or large pellets (~12 mm diameter), right.

Piglet performance was different in each of the two barns, but in both cases, feed intake was significantly higher when piglets were offered large pellets (12 mm diameter) compared to a mini pellet (3 mm diameter).

No PWGL was observed (Figure 7), and on one farm, piglets offered large pellets were, on average, 1.4 kg heavier at 28 days post-weaning.

In this trial, piglets also spent time exploring and playing with the large pellets in the farrowing crates. As a form of enrichment, the large pellets allowed 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.

Maintaining the same feed immediately post-weaning is important for helping piglets cope with the stress of weaning. If using large pellet creep feed, it may be a better option to switch to a mini-sized pellet or mash (of the same feed formulation) at weaning to help prevent feed loss through the slats, as piglets will remove large pellets from the feeder to play with them.



**Figure 7.** Piglet weights at weaning, 2 days and 7 days, post-weaning, on one commercial farm during the OMAFRA creep demonstration trial. Data shows no post-weaning growth lag, regardless of diet; however, pigs fed large pellets had greater increases in gain over this time period, which led to higher body weights 28 days post-weaning.

### Benchmarking

Before making any changes to your creep-feeding protocols on farm, benchmark your 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 creep consumption and determine the proportion of piglets consuming creep within a litter.

### Measuring Creep Consumption

Measuring creep consumption on a litter basis is relatively easy. Figure 8 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

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
<b>Totals:</b>	<b>1,550 g</b>	<b>265 g</b>

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

**Figure 8.** Example of a creep-feed tracking sheet for one litter with calculations.

### Determining the Proportion of Piglets Consuming Creep Feed Within a Litter

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.

### 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 air-tight container.

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 (Figure 9).

It will take approximately 24 hr 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.

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.

### Implementing New Creep-Feeding Practices

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.



**Figure 9.** Piglet with blue dye on nose from marked creep feed (image courtesy of Prairie Swine Centre Inc.).

### SUMMARY

Although you may not see a difference in piglet weaning weights, creep feeding in the farrowing room will improve piglet performance in the nursery if the piglets actually consume it. Creep-feed eaters become familiar with solid feed prior to weaning, and thus have a reduced post-weaning growth lag response when moved to the nursery.

Identifying effective ways to encourage creep-feed intake in piglets can have significant impacts on piglet performance and health, as well as overall profitability. Strategies to increase creep-feed intake often revolve around the form of the creep feed (e.g., pellet, mash or liquid) or the type of feeder used (e.g., round or tray).

Piglets that cope with weaning stresses and do not experience the post-weaning growth lag are less susceptible to disease and have a reduced incidence of morbidity and mortality in the nursery. This is especially important with the push towards removing antibiotics from piglet diets, as it will help improve piglet health and robustness.

Reducing the PWGL not only improves animal health and production in the nursery, it also translates to improved growth performance in later life stages. A difference of 100 g/day feed intake during the first week post-weaning can mean an additional 1 kg of body weight by day 42 of age, and could result in a 1-week reduction in the time it takes to reach market weight.

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