

Stimulating Exploratory Behavior in Piglets: Effects on Pre-Weaning Creep Consumption

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SUMMARY

This study investigated whether pre-weaning creep consumption can be increased through stimulating exploratory behaviour in piglets, and whether this is best achieved through provision of enrichment (E) or through presentation of creep in a large shallow feeder. In order to examine differences between farms, studies were conducted at Prairie Swine Centre (PSC) as well as two commercial farms.

The enrichment treatment (E) consisted of cotton ropes hung in the farrowing pens, and was compared to pens with no enrichment. Each pen was also given one of two types of feeders; a standard feeder or a large tray feeder, giving four different treatment combinations. Results indicate that piglets provided with E interacted with it in 5% of observations. Overall, the tray feeder resulted in a greater frequency of piglet visits to the creep feeder compared to a standard round feeder, but there was no effect of enrichment. Fecal swabs indicated that over 50% of animals with access to a tray feeder were eaters prior to weaning.

The provision of a large tray feeder that encourages social feeding, appears to have a greater influence than rope enrichment on attracting piglets to creep feed. While the increased creep disappearance found with the tray feeder indicates that more piglets were interacting with the creep, no benefits to growth rate were found.



INTRODUCTION

Weaning is a stressful experience for piglets due to several factors, including an abrupt change from a liquid (milk) diet to a solid diet, removal from the sow, change of pen environment, and mixing with other litters. The cumulative result is that piglets will often fail to consume feed in the first days after weaning, and a reduction in growth is commonly seen. In some situations this can also result in reduced immunity and impaired gut function.

Creep feeding in the farrowing pen is done to familiarize piglets with solid food prior to weaning. Trials conducted at Prairie Swine Centre Inc. have previously demonstrated the importance of creep feed intake in the nursing period on growth of the weaned pig. Piglets that consumed creep feed while nursing, or that consumed feed immediately after weaning significantly outperformed their litter-mates. However, studies have shown that fewer than half of the piglets in a litter actually consume creep feed (Beaulieu et al., 2011). In the wild, piglets learn to consume appropriate foodstuffs while foraging in social groups, imitating the behaviour of the dam and littermates (Stolba and Wood-Gush, 1989). In contrast, standard farrowing crates are relatively barren and uniform, and combined with restriction of the sow in a crate, provides little opportunity for interaction or exploration by piglets.

A recent study at Prairie Swine Centre Inc. showed that providing creep feed to piglets in a large tray feeder, as opposed to a conventional round feeder, resulted in a number of improvements. Benefits of the tray feeder included: more frequent feeder visits, more piglets at the feeder per visit, greater creep feed disappearance, and importantly, no weight loss during the first days post weaning.

“Feeder type resulted in a greater frequency of piglet visits to the creep feeder, but there was no effect of enrichment.”

Observation of feeding behaviour indicated that the large tray feeder encouraged social feeding more effectively than the standard round feeder. This is accomplished by facilitating exploratory behaviour and synchronized feeding as compared to when creep was presented in a standard round feeder. However, it is still unknown whether the tray feeder increases the number of piglets consuming creep per litter, or whether it increases the amount eaten by those pigs that consume creep. Therefore, the following study was conducted to investigate whether the results of previous studies could be replicated when repeated at multiple farm sites, and to assess individual piglets response in terms of the number of pigs affected per litter.

MATERIALS AND METHODS

Forty-eight litters were studied on three farms across Saskatchewan farms (16 litters per farm). On each farm, four litters were assigned to each of four treatments.

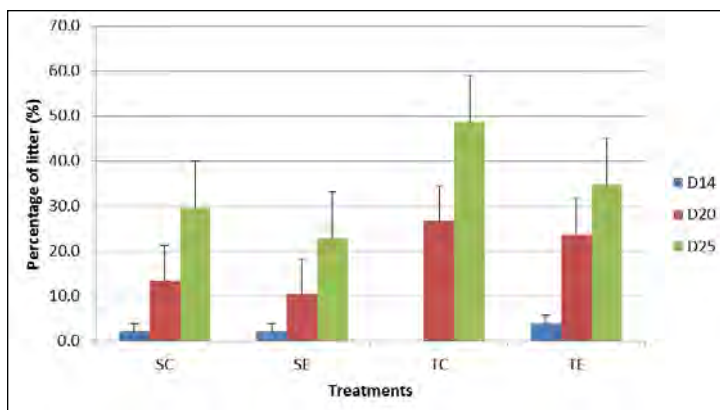


Figure 1: Percentage of piglets per litter showing evidence of creep consumption in farrowing. Results of swabbing on days 14, 20 and 25 of age (pre-weaning) across four treatments, standard creep feeder control (SC), standard creep feeder with rope enrichment in the pen (SE), creep provided in a tray feeder (TC) and creep provided in a tray feeder with rope enrichment provided in the pen (TE). (PSCI herd; n = 16, four litters per treatment).

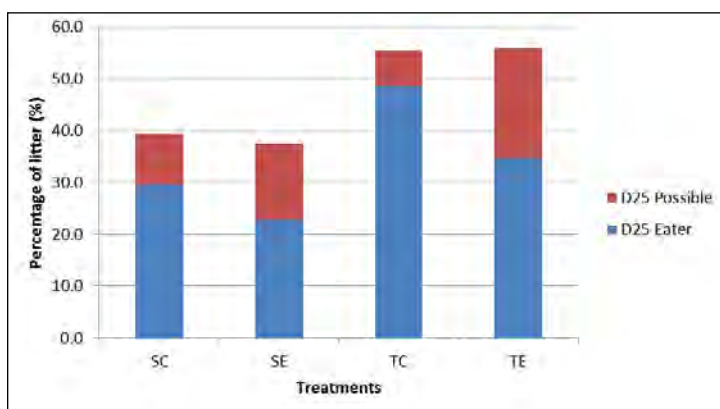


Figure 2: Percentage of piglets per litter considered eaters and possible eaters on day 25 of age (pre-weaning). Four treatments studied: standard creep feeder control (SC), standard creep feeder with rope enrichment in the pen (SE), creep provided in a tray feeder (TC) and creep provided in a tray feeder with rope enrichment provided in the pen (TE). (PSCI herd, n = 16, four litters per treatment).

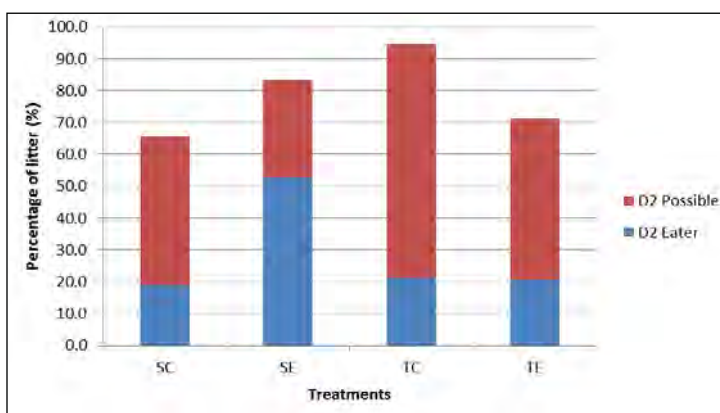


Figure 3: Percentage of piglets per litter considered eaters and possible eaters at day 2 after weaning. Four treatments studied: standard creep feeder control (SC), standard creep feeder with rope enrichment in the pen (SE), creep provided in a tray feeder (TC) and creep provided in a tray feeder with rope enrichment provided in the pen (TE). (PSCI herd, n = 16, four litters per treatment).

Treatments consisted of:

- T1. Provision of creep in a standard feeder (SC),
- T2. Provision of creep in a standard feeder with addition of environmental enrichment (SE),
- T3. Provision of creep in a large tray feeder (TC),
- T4. Provision of creep in a large tray feeder with the addition of environmental enrichment (TE)

In order to encourage exploratory behavior, a cotton rope was provided to treatment groups to encourage exploratory behavior prior to the addition of creep feed. Creep feed was offered to all litters from 10 days of age until weaning. For all farms, on days 12, 19 and 25, an indigestible, non-toxic, food grade dye was added to the piglet creep feed as required. Anal swabs were taken from piglets 48 hours following provision of dye into the creep feed to identify 'eaters' and 'non-eaters'. Eaters were identified as those piglets for which an anal swab revealed the colour of the feed dye.

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- For the PSC herd, the quantity of feed provided to each litter was recorded, and feed returns were measured at weaning, in addition, anal swabs were taken from every piglet per litter on trial.
- Piglets were weighed on four occasions: day five of age, the day of weaning, day two post-weaning (to determine growth-check post weaning) and day 14 post weaning.
- 50% of litters across all treatments were monitored for behavior using digital cameras, with photos taken at five minute intervals.
- Photos were used to document the number of interactions with the enrichment and the number of piglets present at the feeder per visit.

Commercial Herds

- For the two commercial herds, swabs were taken from six piglets per litter, with piglets identified using ear tags.
- Individual pig weights were taken from the six identified piglets at days five and 19 of age (pre-weaning), and days 22 and 34 of age (post-weaning).

At weaning, litters from the same treatment were mixed together to form pen groups in the nursery. Litters that received enrichment in the farrowing pen were also provided rope enrichment in the nursery. On the day of weaning, a different coloured dye was added to the phase 1 starter diet, and pigs were determined as 'eaters' and 'non-eaters' 48-hours later using anal swabs.

RESULTS AND DISCUSSION

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In three of four treatments, piglets showed evidence of creep feed consumption starting on day 14 (4 days after presentation of creep feed), and the percentage of piglets feeding increased over the pre-weaning period (Figure 1). Litters given the tray feeder and no enrichment had the largest percentage of piglets showing evidence of creep consumption on day 25, but this difference was not significant.

Table 2: Effect of feeder type or enrichment provision on percentage of piglets showing evidence of eating creep before and after weaning

Treatments	Before weaning (%)			After weaning (%)		
	Eater	Non-eater	P	Eater	Non-eater	P
Standard (n = 143)	52	48	0.0002	70	30	NS
Tray (n = 147)	73	27		66	34	
Enrichment (n = 145)	58	42	NS	66	34	NS
No enrichment (n = 137)	67	33		70	30	

N.B. Data from the SK 2 site were not included in this analysis.

When including piglets that were considered 'possible eaters' (swab was not bright blue, but darker than normal, indicating probable passage of blue dye) the results indicate more than 50% of piglets were utilizing tray feeders, compared to less than 40% with the standard feeder (Figure 2). When sampled on day two after weaning, litters given the tray feeder showed that, on average, 20% of the litter were definite eaters, with over 90% of the litter being eaters and possible eaters (Figure 3).

Commercial Herds

For the two commercial herds, six pigs per litter were swabbed rather than the whole litter. For one of the herds the percentage of piglets identified as eaters was very low when compared to the other two sites. This most likely indicates there was a problem with either the correct timing and delivery of dye into the creep, or the criteria used to identify "eaters" at that site.

Comparing individual effects of feeder type (standard creep or tray feeder) and presence or absence of enrichment on the percentage of eaters and non-eaters from two sites indicates more "eaters" with the tray feeder prior to weaning (Table 1). Data from one barn site were excluded from this analysis due to the low numbers of eaters before and after weaning.

Growth Rate

Based on the results of this experiment there was no significant effect of feeder type or enrichment provision on the ADG of piglets (prior to weaning, immediately post weaning, or in the post-weaning period). This remained true with data analyzed separately for each site (data not shown).

From data at PSC, pigs identified as possible eaters had a significantly lower ADG in the pre-weaning period (Mean, ADG(kg): Eater: 0.28; Non-eater: 0.30, pooled SEM: 0.01, $P < 0.01$), with no significant effects of 'eater' status on the ADG in the post-weaning period. Examining differences in body weight between eaters and non-eaters, piglets identified as possible eaters had a lighter body weight at day 20 of age (Eater: 6.64 ± 0.14 ; Non-eater: 6.95 ± 0.17 ; $P < 0.01$), and on the day of weaning (Eater: 8.27 ± 0.21 ; Non-eater: 8.62 ± 0.24 ; $P < 0.05$) compared to piglets that were identified as non-eaters.

It was useful to analyze individual piglet weights on whole litter data from PSC. Lower average weights in piglets that were eaters supports earlier research indicating that smaller pigs within a litter generally obtain poorer teats on the sow, receive less milk, and are therefore more likely to consume and benefit from creep feed

CONCLUSIONS

The manner in which creep feed is presented to piglets can be improved, as demonstrated by the significant increase in frequency of visits to the tray feeder as compared to the standard feeder. In addition, the different presentation of creep appeared to increase the number of piglets consuming creep feed. The small number of pigs and litters used in this study made it difficult to find significant differences.

A large tray feeder that encourages social feeding and foraging appears to be more effective at attracting piglets to creep than a standard feeder, or the provision of rope enrichment. While a previous study showed that providing the tray feeder before weaning had a positive effect on piglet growth after weaning, a similar result was not found in the current study. Further research is needed in this area to optimize the pre and post weaning environment to better accommodate the learning and exploratory behaviour of the pig.

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