Using creep feeding as a strategy to improve post weaning feed intake and piglet growth

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Weaned piglets are subjected to a number of nutritional, social and environmental stressors. They are separated from the sow, moved to a new environment, mixed with non-littermates and expected to begin consumption of a novel diet (transitioning from sow's milk to solid feed). It is difficult to determine how much each stressor contributes to the growth lag often observed immediately post-weaning. However, post-weaning anorexia, coupled with the immature digestive and immune systems of the newly weaned piglet increases disease susceptibility and mortality.

Creep-feeding, the practice of providing highly palatable and easily digestible feed to nursing piglets to supplement sow's milk, is a strategy intended to alleviate problems at weaning. In theory, creep feeding should result in heavier piglets at weaning, and since the piglets have been accustomed to solid feed, the post-weaning growth lag should be lessened. However, research results on creep feeding are inconclusive and confounded by several factors including litter size and individual variation in creep feed consumption, between and within litters. Therefore, an experiment was designed to determine which piglets consume creep feed in the farrowing room and whether the presence of creep feed improves feed intake and body weight gain post-weaning. A second objective was to determine if piglets consuming creep feed in the farrowing room have improved post-weaning feed intake. Answers to these questions will provide pork producers with practical information, which could assist with the weaning transition. This, in turn, will decrease pig losses and allow a decreased use of antibiotics while producing piglets, which are heavier at nursery exit.

Figure 1. Piglets in two farrowing pens at creep feeders.

Study design

This experiment was designed to measure, in a commercial-like setting, which piglets in the farrowing room consume creep feed and whether this consumption provided benefits into the nursery, including consumption of the phase 1 starter diet. Nine farrowing groups, totaling 115 sows were randomly assigned to one of 2 treatments (creep or no creep) at farrowing. Cross-fostering of piglets (to equalize litter sizes) was conducted within the first 24 hours after birth. Piglets were weighed at birth and on day 21 when creep feed (commercial stage 1 starter) was provided for those piglets on that treatment. The creep feed was supplied in a commercial feeder, similar to that identified by others (Sulabo et al. 2010) as the feeder which maximized creep feed intake and minimized wastage (Figure 1).

Piglets were weaned as per normal production practice on day 26 post farrowing. Although different litters were mixed at weaning, the treatment groups (creep or no creep) were maintained in the nursery. Whether a piglet had been designated an "eater" or a "non-eater" (described below) did not affect the nursery designation.

The creep feed and the nursery diets were marked with brilliant blue dye and ferric oxide, respectively. The dye was removed from the creep feed 2 days prior to weaning to allow the marker time to exit the body.

Anal swabs were taken from each piglet in the creep fed groups 2 days prior to weaning and from all piglets on day 2 in the nursery to estimate intake of creep feed in the farrowing room and the nursery diet during the first 24 hours, respectively. This allowed us to categorize creep fed piglets into "eaters" and "non-eaters", and to determine if this correlated to feed intake in the nursery in the first 24 hours post-weaning.

Table 1. Effect of creep feed provision from d 21 to d 26 in the farrowing room on nursery performance

	Treatment		SEM	Pvalue
	Creep	No-creep		
Body weight				
Weaning	7.66	7.75	0.12	NS
Nursery exit (d 29)	20.62	20.29	0.34	NS
Average daily gain, nursery				
Weaning to d 3	0.14	0.14	0.02	NS
d 4 to 7	0.14	0.10	0.02	< 0.01
Wean to exit (d 29)	0.45	0.43	0.01	0.05
Average daily feed intake, nursery				
d 0 to 3	0.13	0.12	0.01	NS
d 4 to 7	0.23	0.20	0.01	0.06
Wean to exit (d 29)	0.58	0.56	0.02	NS

*SEM, average standard error of the mean

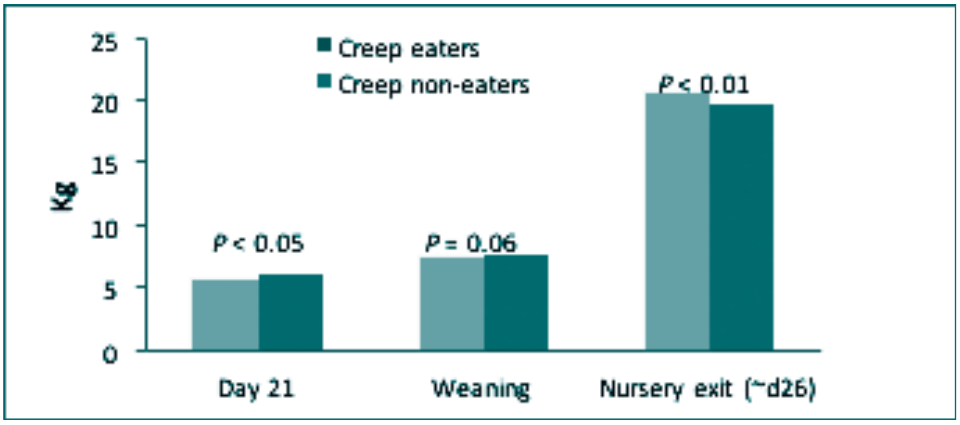

Figure 2. Body weights of piglets offered creep feed in the farrowing room from day 21 to weaning, classified as either "eaters" or "non-eaters" (piglet is the experimental unit).

Results

Effect of creep feed provision on pig performance at weaning and nursery exit

Offering creep feed in the farrowing room for 1 week prior to weaning did not improve overall piglet weaning weight or growth rate from day 21 to weaning. Also, nursery exit weights were similar regardless of creep feed provision (Table 1). However, ADG and ADFI during the nursery phase increased (or tended to increase) in pigs that had been provided creep feed.

Approximately 45 % of piglets had apparently consumed some of the phase 1 diet in the first 24 h post-weaning, regardless of creep feed provision (Table 2, on page 7). This was not affected by birth or weaning weight. It is widely believed that the initial 24 h post-weaning is crucial for piglets' later development. Indeed, piglets identified as nursery "eaters" had greater ADG throughout the nursery period, resulting in slightly greater nursery exit weights.

Finally, of the 37% of piglets designated as creep "eaters", 54% of these were also "eaters" of the phase 1 diet (ee), whereas 44% of the piglets designated as creep "non-eaters" had evidence of phase 1 diet consumption within the first 24 h post weaning (ne; Table 3, on page 7). Therefore, 10% more piglets with evidence of creep feed consumption, consumed phase 1 diet during the initial hours in the nursery. This percentage is less than we were anticipating. Piglets who were nn (no evidence of either creep feed of phase I diet intake) were the lightest at nursery exit. Piglets with evidence of creep feed and phase 1 diet consumption had the highest growth rate from weaning to d3 post weaning and throughout the nursery period.

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stepped out of their vehicle – in 2017 it was back to business as usual, farm vehicles in various states of cleanliness and not one pair of plastic boot covers to be seen. A second example was at a swine industry tradeshow – transport units parked in the lot beside the passenger vehicles. It was not difficult to tell these trailers were swept out but not washed nor baked.

These two examples speak to my concern that we just aren't using all the knowledge available to us to protect our farms.

At the same time I see headlines that tell us health challenges are all around us. Internationally Uruguay has identified PRRS for the first time in widely separated areas. The country undergoes regular testing so what happened? Closer to home, a PRRS virus variant previously associated with Minnesota is now in western Canada. Homegrown problems with Strep Suis seem to be on the rise. The Canada-West Swine Health Intelligence Network noted laboratories reporting an increase in positive cultures. Our own experience is that hot temperatures and extra movement and handling triggered a couple weeks of sudden losses that are not typical for this herd.

Our industry has enjoyed phenomenal growth in productivity and generally improving health status for several years. We know all too well that we cannot rely on continued access to antibiotics, and now additional scrutiny on zinc and previously copper in the EU promises to spill over and take yet one more tool from the troubleshooting toolbox. One editorial suggested 2.50 Euro per pig in reduced earning if Zinc Oxide became unavailable. These factors are all the more reason to keep the biosecurity high.

The following is sourced from the Canada-West Swine Health Intelligence Network Report July 31 regarding heightened biosecurity measures that should be considered as you review your biosecurity plan.

- Managing Transport –wash and bake trucks
- Managing any supplies, including feed ingredients and breeding stock coming from infected areas
- Compost deadstock (to reduce rendering traffic to your farm)
- Follow strict contractor protocols
- Participate in the environmental testing programs

Our Centre is undergoing another internal biosecurity audit. We do this about every 18 months to 2 years, rotating between internal and external audits. Every time we find something. This is time well spent to protect what we have.

Lee

(Using creep feeding ...cont'd from page 5)

Table 2. The effect of apparent phase 1 diet consumption ("nursery eater") during the initial 24 hours post weaning on the nursery performance of piglets.

	Nursery eater	Nursery non-eater	SEM	P value
Number of Pigs	436	527		
%	45	55		
Body weight				
Birth	1.48	1.47	0.02	NS
d 21	5.89	5.99	0.09	NS
Weaning	7.60	7.76	0.11	NS
Nursery weight				
d 3	8.10	8.11	0.10	NS
d 7	8.62	8.55	0.11	NS
d 14	11.09	10.81	0.15	0.04
Exit (d 29)	20.7	20.1	0.34	<0.01
Average daily gain,				
d 21 to wean	0.24	0.25	0.01	0.04
Nursery				
Wean to d 3	0.16	0.12	0.02	<0.01
d 4 to 7	0.14	0.11	0.01	<0.01
d 8 to d 14	0.35	0.32	0.01	<0.01
Wean to nursery exit (d 29)	0.45	0.43	0.01	<0.01

SEM, standard error of the mean

Conclusion

Overall, the provision of creep feed for 5 days prior to weaning had no effect on weaning weights or growth rate from day 21 to weaning, however, modest effects were observed on piglet growth rate in the nursery. Interestingly, within the creep treatment, it was the lighter piglets which took advantage of the creep feed, and this subset of piglets showed an improved growth rate. Therefore, the provision of creep feed in the farrowing room provides benefits to piglets that show evidence of consumption and it is the lighter-weight piglets which benefit most from the provision of creep feed, and thus within litter variability may be reduced.

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Table 3. Performance of piglets categorized as "eaters" or "non-eaters" in the farrowing room and/or the nursery (~24 hours post weaning)

	Eater classification					
	ee	en	ne	nn		
Farrowing	Eater	Eater	Non	Non		
Nursery	Eater	Non	Eater	Non	SEM	P value
n, (piglets)	94	79	129	163		
% of total	20	17	28	35		
Weight						
Birth	1.52	1.49	1.47	1.48	0.05	NS
d21	5.54b	5.76ab	6.01a	5.89a	0.18	0.06
Wean	7.33b	7.57ab	7.80a	7.66ab	0.20	0.05
d3 nursery	7.97	7.97	8.25	7.98	0.21	NS
Nursery exit (d 29)	21.22a	20.91a	20.87a	19.80b	0.54	<0.01
Average daily gain, nursery						
d1 to wean	0.26	0.26	0.26	0.25	0.01	NS
Wean to d3	0.21a	0.13bc	0.15b	0.11c	0.02	<0.001
d4 to 7	0.15ab	0.18a	0.14bc	0.12c	0.02	<0.001
d8 to 14	0.38a	0.35a	0.36a	0.31b	0.02	<0.001
d14 to exit (d 29)	0.66a	0.65a	0.64a	0.61b	0.03	<0.01
Wean to exit (d29)	0.48a	0.46ab	0.45b	0.42c	0.01	<0.001

SEM, standard error of the mean; Means within the same row with different superscripts differ significantly ($p < 0.05$).