Effect of pig weaning age on mucosal colonization by *Haemophilus parasuis*

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Immunity against early colonizers (eg. *Haemophilus parasuis*; **HPS**) is good in early lactation but declines progressively. Since infection status can influence disease incidence in the nursery, we examined the effect of weaning age on **HPS** colonization.

Methods

In the first replicate, 24 litters were used. Half of the litters were derived from mixed parity sows housed in barn 1 and were weaned at 28 d of age. Remaining pigs were derived from primiparous sows housed in a barn 2, on the same farm, and were weaned at 14 d of age. Within each weaning group, piglets from each of 4 litters were nasal swabbed at 14 and 28 d of age and the swabs cultured for HPS. All piglets were weaned into the same nursery but such that each weaning age occupied the nursery at different times. Pigs remained in the nursery until 49 d of age. Pig health was monitored daily for the duration of the experiment.

The second replicate was designed to separate the effects of parity and barn. The litters of 4 primiparous sows housed is each of the above barns were weaned at 28 d of age. Piglets (n=6-7 per litter) were nasal swabbed at 14 and 28 d of age.

Results

In replicate one, at 14 d of age, 53% of piglets from multiparous sows were colonized by HPS while none of the piglets from primiparous sows were colonized. At 28 d of age, 97% of piglets remaining with the sow were colonized while in those pigs weaned at 14 d of age, only 50% were colonized. In replicate two, at 14 d of age, 39% and 25% of piglets in barns 1 and 2, respectively, were colonized by HPS. By the time of weaning at 28 d of age, 96 and 100% of piglets were colonized.

Implication

The results of this study support the theory that a early weaning may result in a low incidence of colonization by **HPS** which predisposes piglets to clinical disease in the nursery. Both barn and parity may influence levels of colonization.

Effect of zinc supplementation to the starter diet on LPS-induced bacterial translocation

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Objective
To determine the effect of 3000 ppm dietary zinc on lipopolysaccharide (LPS)-induced bacterial translocation from the intestine to the mesenteric lymph nodes and systemic circulation.

Methods
Eighteen piglets were fed ad libitum a commercial starter diet with, or without, supplementation of 3,000 ppm zinc oxide (ZnO). After a 6-day adaptation to the diets, the pigs were intramuscularly injected with LPS (derived from *E. coli* 026:B6, Sigma, St Louis MO) at 150 µg/kg body weight. The pigs were monitored throughout the experimental period. At 24-hours after LPS injection, pigs were euthanized and samples were collected.

Results
Fewer ZnO-supplemented than control piglets had evidence of bacterial translocation from the small intestine to the associated mesenteric lymph nodes (3 of 9 vs 8 of 9; $P<0.05$). Furthermore, in ZnO-supplemented pigs, the numbers of bacteria translocating from the small intestine to the corresponding lymph nodes tended to be lower than in the pigs fed the control diet (15±7 CFU/g of tissue vs 387±194 CFU/g of tissue; $P<0.1$). There was no treatment effect on the species of bacteria translocating.

Implications
Supplementation of starter diets with 3,000 ppm ZnO reduced the level of bacterial translocation, possibly by improving the integrity of the small intestine.

Influence of cross-fostering on piglet growth and survival

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Objective
Cross-fostering to equalize birth-weights within litter and accommodation of individual sow rearing capacity is reported to reduce preweaning mortality. Therefore, we conducted an experiment to test this suggestion.

Methods
For the present study, 120 mixed parity sows were induced to farrow with cloprostenol. At farrowing, piglets were weighed and the lightest (L) 50% from 2 litters were grouped on one sow and the remaining heavier pigs (H) on the other. A third sow served as a litter-intact (I) control and no pigs were cross-fostered. Cross-fostering was completed within 12-h of birth. Pigs were again weighed at 3-d and at weaning. Pig performance was assessed on the basis of survival and pre-weaning growth rate. Comparisons were made between litter weight designations (H, L and I) and between H and the heavier half of intact litters (I-h) and between L and the lighter half of intact litters (I-l).

Results and discussion
There was a significant sow effect on pre-weaning piglet growth and survival ($P<0.001$). Patterns of pre-weaning survival were as expected with the heavier pigs having the least mortality and this was unaffected by cross-fostering. Weight gain between days 3 and weaning was not affected by litter weight designation. Post-weaning ADG was not affected by litter weight designation. We conclude from these data that, under the conditions of the present study, the creation of light birth-weight litters does not increase or decrease pre-weaning survival.

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Mixing 4 week old weaned pigs of different weights does not affect growth

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An experiment was conducted to determine the effect of mixing 4 week old weaners of different body weights on post weaning behavior and weight gain. Treatments consisted of three weight difference categories (high, medium and low) with four pens per treatment and eight pigs per pen. Each pen contained four heavier pigs and four lighter weight pigs. Average body weight differences of pigs in each weight difference category were: high (11.4-6.6 kg), medium (9.6-7.5 kg) and low (8.6-8.4 kg). All pigs received a starter ration and water ad libitum and were housed in an environmentally controlled room. Settling in behavior was observed for four hours after placement. Pigs were individually weighed on days 12, 19 and 26 and pen feed intakes were recorded.

Weight gains for the three periods of the experiment (d. 1-12; d. 13-19; d. 19-26) were analysed using GLM procedure of SAS using treatment, pig size, and pen as main effects and weaning weight as covariate.

During the settling in period it was observed that the pens with the highest weight differences had the least amount of fighting and pigs with least weight difference had the highest amount of fighting.

Average daily weight gains for larger pigs tended to be slightly higher than those of smaller pigs in each treatment and in each period but the differences were not significant. These differences decreased as the pigs got heavier. There was no difference in weekly weight gains between treatments or between large and small pigs within pens.

The average body weights and average weekly weight gains were calculated for the four larger pigs and the four smaller pigs in each pen within each treatment for each weighing period. For all treatments it was found that when pigs reached a certain body weight they all gained at the same rate regardless of their weight at weaning or the weights of their penmates.

Implication

These results indicate that mixing and penning together four week old weaners from different litters and of different body weights do not affect weight gains in the four

weeks after weaning.