

The effect of weaning age on behavior of commercial crossbred pigs

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Summary and Implications

Data collected in this study showed that pigs weaned at approximately 10 days of age manipulated other pen-mates more frequently, spent more time play/fighting, and had greater average daily gains soon after weaning when compared with pigs weaned at approximately 30 days of age. Pigs from both treatments were reared in the same environment; therefore, differences were not likely related to a lack of immune system activation.

Introduction

Segregated- and medicated-early-weaning (SEW and MEW, respectively) are technologies used to optimize the health of pigs and improve their economic efficiency. As opposed to free ranging sows, who have been observed to wean their piglets between 60 and 137 days of age (6,11), early weaning management practices remove piglets from the sow on average between 7 and 14 days of age and isolate them in a clean facility. By using separate facilities and weaning piglets at young ages, potential pathogens are not transmitted from the sow herd to the piglet herd (1).

In addition to eliminating pathogenic challenge to the piglets' immune system, SEW has been reported to result in growth characteristic advantages such as improved feed efficiency and growth rate. It has been suggested that these benefits result from the pigs' immune system being in a less active state. In 1996, according to the National Hog Farmer, at least 20% of U. S. producers were using early weaning technologies to capitalize on the benefits these systems have to offer.

However, the reported disadvantages of early weaning management systems include: inconsistent growth performance throughout the finishing phase (14), decreased post-weaning weight gain (7), and abnormal feed intake that may affect metabolism (12). There is also the ever-present risk of exposing the piglets' naive immune system to pathogens to which it is incapable of responding. The immune system in this delicate state may cause piglets to be more susceptible to disease (4). Research on early weaning has found increases in aberrant behaviors such as nosing and flank biting, which can be important indicators of stress (2,4,5,8).

Weaning causes social stress for the piglet, which includes separation from the sow and being mixed into pens with non-litter mates (13). Separation from the dam also prevents piglets from satisfying their drive to suckle teats, and may promote manipulations of other pen-mates in an attempt to satisfy this drive to suckle. Thus, welfare of both performers and receivers of the abnormal behavior may be jeopardized and this has the potential to adversely affect production.

It was our intention to determine if separation of piglets from the sow at approximately 10 days of age, effectively preventing the piglet from suckling the teat, would result in differences in behavior and growth, from birth to slaughter, compared with pigs weaned at approximately 30 days of age.

Materials and Methods

To achieve these objectives, 16 litters from Yorkshire x Landrace sows and Hampshire x Duroc boars were blocked in pairs by their expected date of parturition and randomly assigned to either an early or late weaned treatment. Early weaned (EW) pigs were weaned from their dams at 8 to 13 days of age and late weaned (LW) pigs were weaned at 27 to 34 days of age. Four pigs from each of the 16 litters were chosen based on body weight and placed in four separate pens so that each pen housed a group of four unrelated individuals. A total of 64 pigs in 16 pens (8 pens per treatment) was used. Pigs from both treatments were weaned in two replications, 1 week apart, and placed in 1.2 x 1.2-m nursery pens. Pigs were moved throughout the production facility to grower (1.8 x 1.9-m) and finisher (1.8 x 2.6-m) pens. Pens for both treatments were positioned next to and across from a pen containing littermates so that pen arrangement was identical for both treatments. Gender-mixed pens were equal across treatments.

Early weaned pigs were fed a commercially available milk pellet diet until late weaned pigs were moved to the nursery. Thereafter, all pigs were fed the same corn/SBM diets to meet their nutrient requirements so that all pigs in a room of similar age were eating the same diet. In our study, both treatments were reared in the same environment throughout the experiment; therefore, it was not SEW, simply, early weaning. Body weights were recorded at birth, weaning, 42, 65, 102, 137, and 165 days of age, at which time the experiment was terminated and average daily gains were calculated.

At weaning, time-lapse photography recorded behaviors throughout the pen during 10 hours of normal light and 14 hours of dim light with constant light supplied by heat lamps for the first 5 days after weaning. During 10-minute observations at 600, 1000, 1400, and 1800 hours, 1-minute scan samples were used to record the frequency of lying, standing, and sitting, and total number of drinks, feeder investigations, and time-spent play/fighting. Because we could not see the actual ingestion of feed, feeding was counted when the head of a piglet was in the feeder. Time spent play/fighting was measured when two or more piglets engaged in active contact with at least one standing, and one manipulating

another. This activity appeared to become aggressive, but often involved role reversals indicative of play behavior. We conservatively used both terms to avoid implying the motivation behind this behavior.

In addition, 5-minute, direct observations were conducted on each pig at approximately 40, 60, 80, and 150 days of age to compare time-spent lying, standing, sitting, and play/fighting, as well as frequency of belly nosing, manipulation of another pig, and metal biting. Manipulations were counted when a pig either nosed, bit, pushed, or suckled another pig. Belly nosing was counted when the snout contacted the belly of another pig and moved upward from the point of contact with a rooting type motion. Metal biting was counted when a pig mouthed either the pen or the feeder.

To detect any aberrant behaviors missed during the 5-minute sampling periods, we observed the entire pen for 10 minutes at approximately 50, 95, 123, and 160 days of age to record all occurrences of aberrant behaviors previously mentioned. Overall, pigs in each treatment were simultaneously observed, by two trained observers, for a total of 16 hours from 40 to 160 days of age.

All data were analyzed using the General Linear Models procedure of SAS, except for time spent play/fighting, all occurrences of belly nosing, and manipulation of other pigs; these behaviors were analyzed using the Wilcoxon-Mann-Whitney Ranked Sum Test.

Results and Discussion

Results collected from videotaped behavior represent the mean number per pen for the 1-minute scan samples, lasting 10 minutes, taken four times a day for a total of 16 observations from day 2 to day 5 after weaning. No differences were found between treatments for lying, standing, sitting, drinking, or feeding ($P > .13$; Table 1). During these 4 days of observations, EW pigs spent more time play/fighting than LW pigs (23 vs. 15.3 ± 5 seconds; $P < .006$; Table 1).

Table 1. Behavioral data from day 2 to day 5 after weaning.

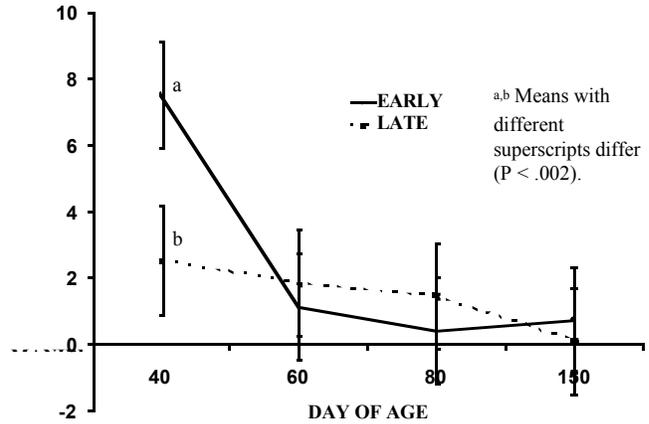
	EARLY WEANED	LATE WEANED
Lying (#)	30.8	33.6
Standing (#)	12.6	9.9
Sitting (#)	.6	.5
Drinking (#)	2.5	3.6
Feeding (#)	4.9	2.9
Play/fighting (sec)	23.0 ^a	15.3 ^b

^{a,b} Means within the same row with different superscripts differ ($P < .006$).

However, during 5-minute direct observations, between 40 and 150 days of age, no differences were found between the treatments in time-spent play/fighting, lying, standing, or sitting ($P > .34$). Total frequency of belly-nosing, metal biting, and manipulations of other pigs were not found to be different between early and late weaned pigs. Although, there was a trend for EW pigs to manipulate others more (2.4 vs. $1.5 \pm .67$; $P < .10$). This trend was explained when we found a significant treatment by day interaction for manipulations of other pigs on day 40 (Figure 1). During this time, pigs weaned at 10 days of age were found manipulating other pigs more frequently than pigs weaned at 30 days of age (7.5 vs. 2.5 ± 1.1 ; $P < .002$). The

LW pigs manipulated pen-mates at the same rate throughout the study period.

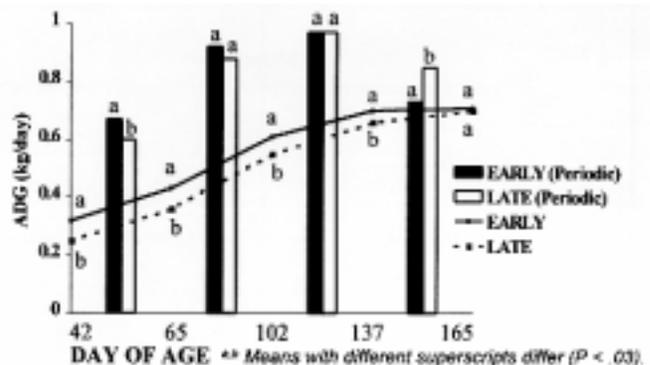
Figure 1. Treatment by day effect on inter-pig manipulations during direct observations from 40 to 150 days of age.



During 10-minute observations of the entire pen for all occurrences of aberrant behavior, no differences were found between treatments for frequency of drinking, belly nosing, manipulations of other pigs, or metal biting. Although we did not detect treatment differences, we did see aberrant behavior performed by pigs in both treatments. Indeed, pigs in both treatments performed manipulations of others about 40 times during the 10-min period.

Differences were found between early and late weaned pigs for both cumulative and periodic average daily gain (ADG) (Figure 2). The lines represent cumulative ADG (from birth to each of the subsequent ages), whereas the histograms represent periodic ADG in each time period (42 to 65, 65 to 102, 102 to 137, and 137 to 165). The ADG was greater for early weaned pigs at 42 days of age and leveled off between 65 and 137 days of age. In the final phase, between 137 and 165 days of age, the pigs weaned at 30 days of age surpassed the early weaned pigs, causing both treatments to even out with an overall average daily weight gain of .7 kg/day from birth to slaughter.

Figure 2. Cumulative and periodic average daily gain.



^{a,b} Means with different superscripts differ ($P < .03$).

Conclusions

Pigs weaned at 10 days of age had greater ADG, play/fought more, and manipulated others more often than pigs weaned at 30 days of age. However, differences were found soon after weaning and disappeared before slaughter. Our results are similar to others' who reported behavioral differences in pigs weaned early (4,8). However, we only noted treatment effects up to 42 days of age, whereas other studies comparing weaning age found aberrant behavior persisted for a longer duration (2,5). The increased growth rate, indicated soon after weaning, is in agreement with research by Molitor and Wiseman (9). However, because the pigs in this study were reared in the same environment, not segregated, nor isolated, the ADG advantage could not be attributed to a completely unchallenged immune system. Several factors likely responsible for differences in results across studies include genetics, environment, immune status, and experimental design. Investigations into these areas, focusing on the stress response to weaning, will give further insight into the welfare implications for pigs raised in these modern production systems.

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