Effects of Intermittent Suckling on Sow and Piglet Performance

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ABSTRACT

The objective of this study was to evaluate effects of intermittent suckling on sow and litter performance. Seventeen crossbred sows and litters were randomly assigned to treatment groups seven days prior to weaning: continuous suckling (CS) and intermittent suckling (IS; litters removed for 6 hr each from day 21 to 28). Litters were weaned at 28 days of age. Feed and water were available to litters and sows at all times. Feed intake was recorded. Body condition scores were collected on sows before farrowing and at weaning. Number of days to return-to-estrus for the sows was also recorded. Litters were weighed at birth and on days 7, 14, 21, 28, 35, and 42 of age. Litter weights were not different (*$P > 0.15$*) between CS and IS pigs before or after weaning. No difference (*$P > 0.10$*) was observed for feed intake between CS and IS litters before or after weaning. Body condition score at weaning was not different (*$P = 0.30$*) between CS and IS sows. Intermittent suckled sows returned-to-estrus in fewer days than CS sows (P < 0.05). Results suggest that intermittent suckling did not alter average daily gain in litters, but reduced the number of days to return-to-estrus in sows.

KEY WORDS: intermittent suckling, litter performance, return-to-estrus

INTRODUCTION

Weaning is a stressful time for all species of animals and can result in negative effects on the neonate after weaning. Stressful events such as weaning can weaken immune function (Hickey et al., 2003) and reduce growth rates (Kuller et al., 2004). In the modern swine industry, piglets are weaned before 30 days of age. The abrupt removal from the highly-digestible sow's milk to a less digestible pig starter can result in low feed intake and poor growth rates after weaning (Kuller et al., 2004). During this time, piglets are also more susceptible to illness due to a compromised immune system and insufficient nutrient intake. Establishing higher levels of feed intake prior to weaning can potentially reduce stress associated with weaning.

It is difficult to encourage starter intake in suckling piglets when the sow is present 24 hours a day providing nourishment in the milk she produces. However, starter consumption can be encouraged in suckling piglets by limiting nursing time. Several studies have reported an increase in starter intake when piglets were separated from the sow for lengthy periods of time each day (Thompson et al., 1981; Kuller et al., 2004).

Along with an increased piglet performance, the sow can benefit from separation. Sows often lose a considerable amount of body condition due to the high nutrient demands of lactation (Foxcroft, 1992). The loss of body condition can result in greater number of days until return-to-estrus after weaning. Sows with litters that were separated each day returned-to-estrus sooner than sows that nursed litters all day (Newton et al., 1987). Kuller et al. (2004) observed sows separated from their litters returning-to-estrus while still nursing. The return-to-estrus while lactating could increase the number of litters born each year. The objectives of this study were to examine the effects of intermittent suckling on sow and piglet performance.

MATERIALS AND METHODS

The study was conducted at Stephen F. Austin State University Swine Center in Central Heights, Texas. Seventeen cross-bred gilts all of seedstock quality were used. Each of these females was selected at random.

All females at time of selection were correct in their structure, an appropriate age and body weight for breeding and appeared to have maternal characteristics. These gilts were selected following a market show and were all 6 to 7 months of age. Each gilt had attained puberty and was cycling at regular intervals (every 18 to 24 days). Prior to the study, all females met a body condition score (BCS) of at least four.

The study was conducted in two replicates, one in the spring of 2008 and the second in the fall of 2008. Females were placed in a free roaming pen approximately 225' by 243'. During this time the gilts were fed 5 pounds (as-fed) of a commercial corn-based ration.

The gilts were monitored and allowed to cycle three estrus cycles prior to breeding. This allowed each female to adjust to their surrounding. After the observation of the 3rd estrus cycle, the females were bred on the 4th observation of estrus. All of the gilts were bred using artificial insemination. Gilts returning to estrus were exposed to a boar for natural service.

The gilts were monitored each day throughout gestation. Five weeks prior to expected farrowing date 5 cc of Sow Bac E (Novartis, Larchwood, IA) was administered to each gilt. Prior to entering the barn (2 weeks prior to farrowing), each gilt was washed with a low concentrate iodine shampoo. At this time the gilts were given a second injection of Sow Bac E and an injectable dewormer. Gilts were housed in gestating pens until farrowing (10' by 10').

Gilts were moved to the farrowing crates (5' by 7') when milk was present or one day prior to expected farrowing date. Each farrowing crate was equipped with an automatic drinker. Gilts were fed free choice a commercial lactating sow ration following parturition. They were monitored during farrowing and were only assisted if problems occurred. Body condition score was assessed at farrowing.

At one day of age, piglets are weighed, ears notched, and needle teeth clipped, and were administered 1.5 cc of injectable iron and antibiotics. At 10 days of age, the piglets received another injection of iron and antibiotics and had their tails docked. Each litter received free choice pre-starter (total of 25 lbs as-fed) beginning at day 3 (20% CP, 9.0% CF, 1.6% lysine).

Piglets were weaned at 28days of age and placed in the nursery. The litters were placed in elevated crates (4' by 8'). Pens were fitted with automatic drinkers and self feeders. Each litter was administered 50 lbs (as-fed) of a pig starter ration (20% CP, 7.5% CF, 1.6% lysine). The litter finished the study on grower (19% CP 5.5% CF, 1.4% lysine). At weaning, piglets were weighed and given 3cc of a combination vaccine for mycoplasmal pneumonia, swine influenza, erysipelas, and circovirus. They were also administered an injectable dewormer. At 42 days of age pigs received a second injection of mycoplasmal, swine influenza, erysipelas, and circovirus vaccine.

At weaning, sows received 5cc of Farrow Sure Plus B (Novartis, Larchwood, IA) or Parvo Shield (Novartis, Larchwood, IA), and 6 cc of a combination porcine reproduction and respiratory syndrome, circovirus, and swine influenza vaccine. Body condition score was also assessed. The sows were then penned in groups based on this score to ensure their ability to recuperate back to original BCS. Sows were observed five times daily for signs of estrus until strong evidence of heat was present. These were assessed as a boar was presented to the sow.

Treatment. Litter sizes were not standardized among sows due to the overall goal of the university swine center program. If a sow had more pigs than available teats, then pigs were move within three days of age. Half of the litters were assigned to a treatment group (IS) and the other portion was assigned to a control group (CS). Intermittent suckling piglets were removed from the sow and placed in a nursery crate with free choice feed and water for six hours, beginning at 0800 and returning at 1400 hours. Separation began at three weeks of age (one week prior to weaning). During the separation period, sow remained in the farrrowing crate with access to feed and water. The sows were not exposed to boars at this time.

Each pig was weighed at birth and every seven days until day 42. Both the control and the intermittent suckling groups were handled and managed in the same manner during the study.

Data Analysis. Effects of intermittent suckling on feed intake, body weight, body condition score, and return-to-estrus were analyzed using the GLM procedure of SAS. The model contained the effects of treatment, replicate, and the treatment × replicate interaction.

RESULTS

Initial body condition score of sows prior to farrowing was not different (P = 0.09) between the IS and CS sows (Table 1). However, a difference in initial body condition score was observed (P = 0.0001) between the two replicates. Final body condition score was not different (P = 0. 30) between the CS and IS treatment sows, but a difference between replicates was observed for final body condition score. Differences in the replicates could be attributed to a change in personnel collecting the body condition score measurements for each replicate. Replicate two had a higher body condition score for both the initial and final scores.

The IS sows returned-to-estrus sooner (P < 0.05) than the CS sows (Table 1). The IS sows returned-to-estrus seven days sooner than the CS sows. It should be noted that there were two CS sows that did not show signs of estrus until 15 or more days after weaning. These sows had adequate body condition at the time of weaning. Those sows rebred and have had litters since the study was conducted. There were no replicate or replicate by treatment effects (P > 0.50).

DISCUSSION

Differences in body condition were not observed between IS and CS sows in this study. It is not uncommon for sows to lose a considerable amount of body condition due to the high nutrient demands of lactation (Foxcroft, 1992). The loss of body condition can result in greater number of days until return-to-estrus after weaning. Kuller et al. (2004) reported that sows that intermittently suckled pigs retained a greater portion of body weight through weaning. They attributed the lower weight loss due to a reduction in the demand for milk. Although the intermittent suckled sows lost less weight, they did not observe a relationship with sow weight and weaning-to-ovulation interval.

Table 1. Sow initial and final body condition score[a] and days to return-to-estrus

Treatment	CS	IS	SE	*P*-value
Initial Body Condition Score	4.25	4.50	0.09	0.09
Final Body Condition Score	2.50	2.51	0.01	0.30
Return-to-estrus (days)	12.23	5.13	2.34	<0.05

[a] Body condition score (1 = thin, 5 = obese)

Feed intake for each week was not different ($P > 0.10$) between the CS and IS litters (Table 2). No significant interaction ($P > 0.10$) was observed for feed intake for the CS and IS litters.

Table 2. Mean feed intake[a] for litters during each week of the study

Treatment	CS	IS	SE	*P*-value
Feed intake week 1	0.23	0.00	0.10	0.13
Feed intake week 2	0.92	0.93	0.36	0.98
Feed intake week 3	3.04	2.44	0.91	0.64
Feed intake week 4	5.85	7.76	1.20	0.27
Feed intake week 5	66.89	59.14	8.94	0.54
Feed intake week 6	94.61	93.87	12.5	0.96

[a] Intake as-fed (lb)

A significant interaction ($P < 0.05$) was observed for individual piglet body weight during the study for birth weight, and weights on days 7, 21, 28, 35, and 42 (Table 3). No interaction ($P = 0.09$) was observed for day 14 body weight data.

Table 3. Body weight[a] for piglets during the study

Treatment	CS	IS	SE	*P*-value
Birth weight	2.72	2.67	0.63	0.52[b]
Day 7	5.09	4.99	0.15	0.62[b]
Day 14	7.64	7.46	0.23	0.61
Day 21	10.86	10.51	0.33	0.44[b]
Day 28	14.47	13.71	0.41	0.19[b]
Day 35	18.94	18.55	0.52	0.59[b]
Day 42	25.29	24.66	0.71	0.52[b]

[a] Individual piglet body weight (lb)
[b]Significant replicate × treatment interactions ($P < 0.05$)

In our experiment, we reported fewer days to return-to-estrus in intermittent suckled sows. This is similar to other studies (Kuller et al., 2004; Newton et al., 1987). Kuller et al. observed 22% of the intermittent suckling sows returning-to-estrus while lactating. Intermittent suckling reduces the demand for nutrients due to less milk production. It also reduces total suckling time on a sow. Suckling action has been shown to reduce GnRH secretion and block follicular development (Britt et al., 1985; Armstrong et al., 1988). Intermittent suckling resulted in an increase in LH secretions which increased the chances of ovulation in sows (Langendijk et al., 2007). Since we did not observe differences in body condition in our sows, it is likely that the reduction in days to return-to-estrus were the result of suckling action.

Differences in piglet body weight or average daily gain were not observed before or after weaning. This is in contrast to results reported by Kuller et al. (2004). They reported a reduction in average daily gain during the intermittent suckling period. Their results were similar to that observed by Thompson et al. (1981). These two studies separated their piglets for 12 hours each day. In our study, the piglets were only separated from the sow for six hours each day. It is possible that this amount of time was not enough to reduce weight gain. Both studies also observed an increase in average daily gain shortly after weaning in the intermittent suckling piglets compared to the control litters. This increase in weight gain could be attributed to better preparation for weaning. The intermittent suckled litters were acclimated to being away from the sow and had increased their feed intake. Kuller et al. (2004) and Thompson et al. (1981) reported an increase in feed intake both pre- and post-weaning in the intermittent suckling piglets. We did not observe an increase in feed intake in our intermittent suckling litters pre- or post-weaning. The intermittent suckling piglets did appear to be more acclimated to weaning based on visual observations. It was noticed that the intermittent suckling piglets did not vocalize or pace the nursery crate to the extent that we observed in the control litters. The intermittent suckled piglets appeared to be more content at weaning. Berkeveld et al. (2007) reported that eating behavior was increased shortly after weaning in intermittent suckled piglets compared to control litters. This behavior will lead to increased average daily gain and is an indicator of less stress associated with weaning which are beneficial to the piglets.

CONCLUSION

Results from this study demonstrate that intermittent suckling did not increase feed intake or growth rate compared to continuous suckling. Less pacing and squealing at weaning was visually observed for intermittent suckling piglets suggesting that these litters were less stressed and accustomed to being removed from their sow. Intermittent suckling reduced the days to return-to-estrus in the sows. This suggests that the removal time was long enough to stimulate return-to-estrus. Longer separation time may facilitate increased feed intake in the piglets during separation, but could lead to decreased milk intake and reduced body weight gain. However, the data may suggest that intermittent suckling may have an effect if more litter data was collected. Additional research is warranted to further evaluate intermittent suckling effects in sows and pigs.

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