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**K****SUCCESSFUL INDUCTION OF ESTRUS DURING LACTATION FOR  
SOWS SEPARATED FROM THEIR LITTERS****S**

Jeffrey S. Stevenson and Duane L. Davis

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Summary

Our objective was to determine the effectiveness of inducing estrus during lactation by temporarily separating the litter from the sow during the last week of lactation. Lactating sows were removed daily from their litters for either 1) 3 hr/day (n=20), 2) 6 hr/day (n=39), or 3) 12 hr/day (n=10) during the last 8 days of lactation and exposed to an intact boar for at least 1 hr during the separation period. Litters were weaned from control sows at either 2 (n=13) or 4 (n=15) weeks for comparison of intervals to estrus following complete weaning or temporary separation. Estrus was observed in 13 of 20 (3 hr), 28 of 39 (6 hr) and 5 of 10 (12 hr) sows during 4 to 8 days after temporary separation periods began. Estrus was observed in 13 of 13 (2-wk weaning) and 13 of 16 (4-wk weaning) control sows from 2 to 8 days after weaning. Average intervals to estrus following temporary separation and weaning were similar (separation = 5.1 days and weaning = 4.6 days). Daily separation of sows for 3, 6, or 12 hr/day resulted in 45% (9/20) of the primiparous sows and 76% (37/49) of the multiparous sows showing synchronous estrus in 4 to 8 days after separation began.

Introduction

Minimizing the interval between farrowings for sows can be accomplished by reducing lactation length and the interval from weaning to conception. Lactation lengths of approximately 3 to 4 wk appear to be optimal for maximizing total pigs born per sow per year. However, an alternative approach to reducing farrowing intervals is to shorten both lactation length and weaning to conception intervals. Successful induction of estrus during lactation is one method that could accomplish that goal. However, better understanding of the factors that control the onset of estrus in lactating sows that are normally acyclic (anestrus) first must be accomplished. In this study, we have chosen to examine the influence of the time of separation for sow and litter on the incidence of estrus. It is interesting that in some areas of the world, treatments like those imposed in this study are used routinely in pig breeding herds.

Procedures

Four trials were conducted to examine the effect of separation of the sow and litter during the last 8 days of lactation (3 to 4 wk). Crossbred (Yorkshire x Duroc) sows of mixed parity were assigned randomly to one of three litter separation treatments. Sows were weaned temporarily for either 3, 6, or 12 hr/day. Weaning of treatment litters occurred on the morning of the last day (day 8) of temporary separation. Control sows had their litters weaned at either 2 or 4 weeks of age. Sows were exposed to an intact boar for at least 1 hr/day during the separation period and checked twice daily for estrus.

### Results and Discussion

Temporary separation of sows from their litters for either 3, 6, or 12 hr/day resulted in similar proportions of sows in estrus. Increasing the temporary period of separation with constant boar exposure did not increase the lactational estrous response (table 1). While 67% of the sows treated came into heat during lactation, more ( $P < .05$ ) multiparous sows (76%) than primiparous sows (45%) responded to treatment. When compared to the estrous response of sows during lactation (table 1), there were more control sows (92%) that returned promptly to estrus after weaning as expected (table 2). Three sows failed to show estrus. Two sows had new corpora lutea at surgery (15 days after weaning) suggesting that they had ovulated (were in heat) just before weaning. The third sow was anestrus having only small ovarian follicles.

Table 1. Proportion of Sows in Estrus After Temporary Separation Periods: Influence of Parity and Duration of Separation<sup>a</sup>

Separation period (hr)	Parity					Total	%
	1	2	3	4	5		
3	2/7	7/9	0/0	2/2	2/2	13/20	65
6	7/13	13/16	2/2	2/2	4/6	28/39	72
12	0/0	1/5	1/1	0/0	3/4	5/10	50
Total	9/20	21/30	3/3	4/4	9/12	46/69	67
%	45	70	100	100	75	67	

<sup>a</sup>No. sows showing estrus during lactation/No. sows treated.

Table 2. Proportion of Sows in Estrus After Weaning: Influence of Parity and Lactation Length<sup>a</sup>

Weaning week	Parity					Total	%
	1	2	3	4	5		
2	6/6 <sup>b</sup>	4/4	0/0	1/1	2/2	13/13	100
4	4/6 <sup>b</sup>	5/5	2/2	1/1	1/2	13/16	81
4 <sup>c</sup>	8/8	3/3	0/0	0/0	0/0	11/11	100
Total	18/20	12/12	2/2	2/2	3/4	37/40	92
%	90	100	100	100	75	92	

<sup>a</sup>No. sows showing estrus after weaning/No. sows weaned.

<sup>b</sup>Two sows ovulated before weaning (during lactation).

<sup>c</sup>Sows that were separated temporarily from their litters that did not show estrus until after weaning.

Distribution of when estrus occurred according to separation treatments is in table 3. Sows came into estrus between 4 and 8 days after first separation. Distributions appeared similar and average intervals to heat were not different, whether a separation of 3, 6 or 12 hr was imposed (table 3). Overall, interval to estrus averaged 5.1 days. The distribution of estrus for control sows after weaning was similar to that of treatment sows. Sows returned to estrus between 2 and 8 days after weaning whether weanings occurred at 2 or 4 wk or whether the sows had been separated during lactation but had not shown estrus before weaning. Overall, control sows average 4.6 days from weaning to estrus (table 4). Intervals to estrus from initial separation periods or from weaning were strikingly similar.

These data suggest that those sows (67%) that showed estrus during lactation responded to treatment just as if they had been weaned completely. Factors responsible for their response compared with sows that failed to show estrus until after weaning were not obvious. Changes in body weight since farrowing and feed intake during lactation did not explain the differences. The fact that older sows responded better than first-litter sows is expected because younger sows are slower to begin estrous cycles after weaning in all seasons than are older sows.

Further studies in this area will characterize the hormonal changes occurring in sows responding and not responding to litter separation. These data will be used to understand mechanisms controlling estrus during lactation and after weaning.

Table 3. Distribution of Estrus for Sows After Temporary Separation for 3, 6, or 12 hours per day

Days to estrus	3 hr	6 hr	12 hr	Total
4	4	12	0	16
5	6	9	1	16
6	2	4	3	9
7	0	1	1	2
8	1	2	0	3
Total in estrus	13	28	5	46
Total treated	20	39	10	69
Response, %	65	72	50	67
Average	5.1	5.0	6.0	5.1
S.D.	1.1	1.2	.7	1.1

Table 4. Distribution of Estrus for Sows After Weaning

Days to estrus	2 wk	4 wk	4 wk <sup>a</sup>	Total
2	0	1	0	1
3	0	2	1	3
4	9	8	4	21
5	3	0	2	5
6	1	0	1	2
7	0	2	0	2
8	0	0	3	3
Total in estrus	13	13	11	37
Total weaned	13	16	11	40
Response, %	100	81	100	92
Average	4.4	4.1	5.4	4.6
S.D.	.6	1.4	1.8	1.4

<sup>a</sup>Sows separated temporarily from their litters that did not show estrus until after weaning.

