

The results obtained in this study suggest that PMS injections may be timed from an estrus induced by injecting prostaglandins. They further suggest that a combination of PMS plus prostaglandin may be used to induce superovulation at mid-cycle or to improve the superovulatory response to PMS injected late in the cycle.

Reproductive Performance of Range Cows with Various Suckling Intensities

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Story in Brief

At calving, 44 Hereford x Holstein cows were assigned to one of three suckling intensities; own single calf, a single foster calf or a foster calf and their own calf. The cows were maintained under range conditions and supplemented so body weight loss during October to April was similar for all treatments. Cows nursing two calves had a longer interval after calving until plasma progesterone increased to greater than 1 ng/ml than cows nursing only one calf. Increasing the suckling intensity also increased the interval until the first heat after calving. By 90 days after calving, 71.4% of the cows nursing their own calves had exhibited estrus but only 42.8% of the cows nursing two calves had been in heat. These data indicate that increasing the suckling intensity increased the postpartum anestrous period in range cows although percent body weight loss was similar in cows nursing one or two calves.

Introduction

Any effort to improve the productive efficiency of range cows must be directed towards insuring that every cow weans a calf each year. If a cow is to have a calving interval of 12 months or less, she must calve, resume having estrous cycles, be bred and conceive within a period of no

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more than 90 days. Thus, the length of the postpartum anestrous interval (period when cows do not have estrus or heat) becomes of vital concern. It is usually not a problem in cow herds receiving adequate nutrition. However, many range cow herds are on their poorest nutritional levels of the year (late winter and early spring) during late pregnancy, calving and for most of the early postpartum period. The result is that too many range cows have undesirably long postpartum anestrous intervals and reproductive performance is greatly reduced.

In addition to level of nutrition, there are a number of other factors known to influence the length of the postpartum anestrous interval. One of these is suckling intensity; that is the total length of time a cow is nursed per day. Obviously, twins would impose a more intense suckling intensity on a cow than would a single calf. However, there is also the possibility that selection for larger, faster gaining calves would result in calves that nurse more frequently. Whatever the cause, however, it appears desirable to learn more about the relationship between suckling intensity and reproductive performance.

The purpose of this experiment was to study the effect of suckling intensity on the onset of ovarian activity and the number of days to the first estrus after calving. Another objective was to determine if cows have a "silent" estrus and ovulate prior to the first postpartum estrus.

Materials and Methods

This study was conducted during October 1974 through April 1975 and utilized 44 six year old Hereford x Holstein cows. The cows were maintained under range conditions receiving supplementary feed necessary to maintain a similar body weight loss during October through April for the cows on all treatments (about 20% of fall weight).

At the time of calving, during November through February, the cows were assigned to one of three treatments. One group of cows kept their own calf; another group of cows received a foster calf to replace their own; and the third group was given a foster calf in addition to their own calf. These treatments created varying levels of suckling intensity. Sterile bulls were used to detect estrus and blood samples were obtained once weekly following calving until about day 90 postpartum. Plasma progesterone was quantified by radioimmunoassay.

Results and Discussion

Body weight loss (including calving weight loss) for cows on all treatments was similar. By April, most cows had lost about 20% of their Fall weight (Table 1). Even though cows with two calves produced about

Table 1. Characteristics of Postpartum (PP) Range Cows with Various Suckling Intensities.

Criterion	Treatment		
	Own Calf	Foster Calf	Two Calves
Cows, no.	14	16	14
Winter weight loss, %	19.0±.9 ¹	20.4±1.1	18.6± 1.2
First PP estrus, da.	67.0±6.4	62.1±9.1	94.6±11.5
Time PP when progesterone was greater than 1 ng/ml, da.	65.0±5.8	51.1±6.8	84.7± 7.8
Suckling interval, min/da.	32.4±2.9	-----	46.1± 4.1

¹ Mean ± SE

39% more milk than cows with their own single calf it was possible to have all cows in similar body condition during the postpartum period by increasing the protein and energy supplementation.

Table 1 further reveals that, on the average, the first postpartum estrus occurred earlier after calving in cows nursing their own (67 days) or foster calves (62 days) than in cows nursing two calves (95 days). Thus, increasing the suckling intensity increased the postpartum anestrous interval. This effect was apparently independent of nutrition, since all cows lost similar weight during the winter period.

The average interval from calving to first estrus is somewhat misleading as to how quickly all cows in the herd could be rebred. Table 2 presents the percentage of the total cows in each treatment group that had exhibited estrus, and could have been bred, by 30, 60 and 90 days after calving. Cows nursing a single calf, whether their own or a foster calf, were similar although slightly more cows nursing a foster calf had resumed estrual activity at each time. However, cows nursing two calves were definitely inhibited in return to estrus following calving. Only 42.8% had shown estrus by 90 days postpartum compared to 88.8% of those suckling foster calves and 71.4% of those nursing their own calves. It is important to emphasize that in no group were all of the cows ready to rebreed by 90 days postpartum.

After estrus, if ovulation occurs, the corpus luteum begins to form

Table 2. Estrual Activity of Postpartum (PP) Range Cows with Various Suckling Intensities.

Item	Treatment		
	Own Calf	Foster Calf	Two Calves
Cows that exhibited estrus			
30 days PP, %	0	11.0	0
60 days PP, %	35.7	44.4	14.2
90 days PP, %	71.4	88.8	42.8

on the ovary and secrete progesterone. Non-cycling or anestrus cows have plasma progesterone concentrations of less than 1 ng/ml, whereas, progesterone levels of more than 1 ng/ml is an indication that ovulation has occurred and a corpus luteum is present. Therefore, blood plasma concentrations of progesterone can be used as an indicator to determine whether ovulation has occurred in cows. Cows nursing two calves had longer intervals postpartum until plasma progesterone was greater than 1 ng/ml than did cows suckling either their own calf or a foster calf (Table 1). Thus, increasing the suckling intensity increased the interval to the onset of ovarian activity and ovulation, as well as the interval to first estrus.

Plasma progesterone concentrations were assayed in the blood collected before and after estrus was first detected. Thus, it could be determined whether the cows had ovulated before the first standing heat and whether they ovulated after the first estrus. All cows could not be used in this part of the study, because blood samples were not collected for a long enough interval before or after the first estrus. Of the cows nursing their own calves, none of 11 ovulated prior to first estrus as indicated by plasma progesterone levels less than 1 ng/ml (Table 3). However, 3 of 8 cows with two calves had progesterone greater than 1 ng/ml before their first estrus, which is evidence that they had ovulated without exhibiting estrus (silent heat). Six of the 7 cows nursing their own calf had progesterone concentrations greater than 1 ng/ml, which indicates that they ovulated after their first observed estrus. All of the 6 cows nursing two calves ovulated after their first postpartum estrus.

Data obtained in this study indicates that increasing the suckling intensity increases the interval from calving until the time when the ovary becomes functional. Since this effect is independent of the nutritional status of the cows, it suggests that suckling probably inhibits secretion of gonadotropic hormones by the anterior pituitary. Gonadotropic hormones normally cause follicular growth and ovulation. It is significant that the cows nursing their own calf had only 71% in estrus by 90 days after calving. This is probably the result of the level of nutrition being

Table 3. Plasma Progesterone Concentrations Before and After the First Postpartum Estrus.

Item	Treatment	
	Own Calf	Two Calves
Cows with progesterone greater than 1 ng/ml before first estrus, no.	0 of 11	3 of 8
Cows with progesterone greater than 1 ng/ml after first estrus, no.	6 of 7	6 of 6

somewhat lower than that necessary for maximum performance. This nutritionally induced reduction in ovarian activity may also be caused by a reduced level of secretion of gonadotropic hormones. When less than desirable nutrition is combined with an increased suckling intensity, a serious problem of reduced ovarian activity is created. Thus, suckling intensity must be taken into account in developing proper feeding and management techniques designed to achieve the goal of a calf per cow per year.

Testosterone in Boars after Treatment with Gonadatropins

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Story in Brief

Two experiments were conducted to evaluate changes in serum testosterone after the intravenous infusion of luteinizing hormone (LH) or the intramuscular injections of Pregnant Mare Serum (PMS). Four yearling Yorkshire boars of proven fertility were anesthetized and indwelling cannulae were placed in the anterior venae cavae. On the 8th day after cannulation, blood samples were collected at various times before and after infusion of 1 mg NIH-LH-S18. Serum testosterone increased to 16.7 ng/ml at one hour after LH infusion and remained elevated for at least 6 hours.

On the tenth day after cannulation, blood samples were collected before and after intramuscular injection of 1000 IU of PMS. Serum testosterone was significantly higher during 6 to 36 hours after injection, than during the preinjection or early post injection periods. Maximum serum testosterone occurred sooner after LH infusion than after PMS injection.

Introduction

Some of the problems associated with reduced reproductive efficiency in boars, such as loss of libido and decreased sperm production, may be due to reduced testosterone production by the testicle. It has