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Calf presence and milking twice daily prolongs postpartum anestrus

Abstract

Four treatments were initiated approximately 15 days after calving: 1) calf was weaned permanently from its dam (CW; n=6); 2) calf was present continuously with its dam (CPO; n=5); 3) calf was weaned permanently from its dam + dam was milked twice daily (CWM; n=6); 4) calf was present continuously with its dam but contact with the udder was prohibited + dam was milked twice daily (CRM; n=5). During the 4-week treatment period, cows in the CRM treatment produced about twice as much milk, milk fat, milk protein, milk lactose, and milk solids-not-fat (SNF) than CWM cows. After completion of treatments, calves were returned to their dams and allowed to suckle ad libitum. After calves had been reunited with their dams for 1 week, cows in the CRM treatment produced similar amounts of milk, milk fat, milk protein, milk lactose, and milk SNF as CPO cows, but about twice as much as CWM cows. Cows weaned and milked twice daily had their first postpartum ovulation about 2 weeks after weaning, similar to cows weaned but not milked, whereas cows milked in the presence of their own restricted calf first ovulated in about 4 weeks and calf-present cows in about 5 weeks. We conclude that both milk removal (either mechanically or by a calf) and a cow-calf bond are essential to prolong postpartum anestrus.

Keywords

Cattlemen's Day, 1996; Kansas Agricultural Experiment Station contribution; no. 96-334-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 756; Beef; Cows; Milking; Suckling; Calf presence; Anestrus

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**CALF PRESENCE AND MILKING
TWICE DAILY PROLONGS
POSTPARTUM ANESTRUS**

G. C. Lamb, J. M. Lynch, and J. S. Stevenson

Summary

Four treatments were initiated approximately 15 days after calving: 1) calf was weaned permanently from its dam (CW; n=6); 2) calf was present continuously with its dam (CPO; n=5); 3) calf was weaned permanently from its dam + dam was milked twice daily (CWM; n=6); 4) calf was present continuously with its dam but contact with the udder was prohibited + dam was milked twice daily (CRM; n=5). During the 4-week treatment period, cows in the CRM treatment produced about twice as much milk, milk fat, milk protein, milk lactose, and milk solids-not-fat (SNF) than CWM cows. After completion of treatments, calves were returned to their dams and allowed to suckle ad libitum. After calves had been reunited with their dams for 1 week, cows in the CRM treatment produced similar amounts of milk, milk fat, milk protein, milk lactose, and milk SNF as CPO cows, but about twice as much as CWM cows. Cows weaned and milked twice daily had their first postpartum ovulation about 2 weeks after weaning, similar to cows weaned but not milked, whereas cows milked in the presence of their own restricted calf first ovulated in about 4 weeks and calf-present cows in about 5 weeks. We conclude that both milk removal (either mechanically or by a calf) and a cow-calf bond are essential to prolong postpartum anestrus.

(Key Words: Cows, Milking, Suckling, Calf Presence, Anestrus.)

Introduction

Reproduction is the major limiting factor in the efficiency of production in beef cattle enterprises. Gestation length limits producers to one calf crop per year. The largest loss in the potential calf crop is the failure of cows to conceive during the breeding season. This loss can be reduced by shortening the interval to first postpartum estrus.

The cow-calf suckling interaction is a critical component in maintaining anestrus. Cows suckled continuously had longer intervals to first estrus than cows whose calves were weaned. Maintaining cows continuously with their muzzled or nose-plated nonsuckling calves prolonged anestrus as long as when calves were allowed to suckle, because the perception of suckling or milk removal was maintained with continued calf presence.

Cows that limit-nursed an alien calf (limited to four, 10-min, suckling bouts per day) had a shorter anestrus than cows nursing their own calves. However, cows nursing foster calves continuously or nursing alien calves continuously in the presence of their own restricted calves (own calves were present continuously but contact with the udder was prohibited) had intervals to first ovulation similar to those of cows nursing their own calves but longer than those of weaned cows. This suggests that a cow must first recognize the suckling calf to be her own (natural born calf or reformed with a foster calf) before subsequent suckling will

prolong anestrus. The present experiment was designed to determine whether milking a cow twice daily in the presence or absence of her own udder-restricted calf would alter the postpartum interval to first ovulation.

Experimental Procedures

Twenty-two multiparous, crossbred (Angus Hereford) cow-calf pairs were assigned randomly to four treatments at 15 days after calving: 1) calf was weaned permanently from its dam (calf weaned; CW; n = 6); 2) calf was present continuously with its dam (own calf present; CPO; n = 5); 3) calf was weaned permanently from its dam, plus dam was milked twice daily (calf weaned + milked; CWM; n = 6); 4) calf was present continuously with its dam but contact with the udder was prohibited, plus dam was milked twice daily (calf restricted + milked; CRM; n = 5). Cows remained on treatment for 4 weeks, after which CWM and CRM cows were reintroduced to their calves and allowed to nurse their calves continuously. Daily blood samples were collected from cows to determine their first increase in progesterone after the initiation of treatments. Ovulation occurred 1 to 2 days before serum progesterone exceeded .5 ng/ml for at least 2 days.

Cows were fed individually to meet or exceed NRC recommendations, and intakes were adjusted weekly according to individual body weight and condition. The CW cows were fed as dry second-trimester, pregnant, beef cows and the CPO, CWM, and CRM cows were fed as superior milk producers. Restricted calves in the CRM treatment were fed milk replacer twice daily.

Milk production was recorded daily, and milk samples were collected weekly to assess contents of fat, protein, lactose, and solids-not-fat (SNF) and somatic cell count (SCC) in the CWM and CRM treatments. One week after terminating treatments (after CRM and CWM cows had been reintroduced to their calves and suckled ad libitum for 1 week), 24-hour production of milk (two milkings during 24 hours after receiving 20 I.U. of oxytocin), and fat, protein, lactose, SNF, and SCC in milk were measured.

Results and Discussion

Daily milk production characteristics of calf weaned + milked and calf restricted + milked cows during the 4-week treatment period are shown in Table 1. Production of fat, protein, lactose, and SNF in milk was greater ($P < .05$) in calf restricted + milked cows than in calf weaned + milked cows. In addition, daily milk production (Figure 1) throughout the 4-week treatment period was greater ($P < .05$) for calf restricted + milked cows than for calf weaned + milked cows. Therefore, the presence of a cow's calf is a critical component in maintaining milk production in milked beef cows.

Milk yield for calf weaned + milked, calf restricted + milked, and calf-present cows 1 week following the conclusion of treatments is shown in Table 2. Cows in the calf restricted + milked and calf-present treatments produced similar amounts of milk, milk fat, milk protein, milk lactose, and milk SNF; and all milk traits were greater ($P < .05$) than those of calf weaned + milked cows. The presence of the cow's non-suckling calf in the CRM treatment during the 4-week treatment period maintained milk production. Thus, when calf restricted + milked cows were reunited with their calves and suckled for 1 week, their milk production was similar to that of calf-present cows. Because the calf was absent during the treatment period for calf weaned + milked cows, milk production declined, which probably accounts for the decrease in production 1 week after they were reunited.

The postpartum interval to first increase in progesterone was shorter ($P < .05$) in the CW (16.5 – 4.2 d) and CWM (14.2 – 4.2 d) treatments than in the CPO (35.6 – 4.5 d) and CRM (27.6 – 4.5 d) treatments. These results support our earlier report (1995 Cattleman's Day; KAES Report of Progress 704:105), indicating that anestrus is prolonged in cows maintained with their own restricted calf but suckled by another calf or maintained with their own restricted calf and milked. Maintaining anestrus involves two critical components: 1) a cow must recognize and remain bonded to her own calf and 2) a cow must be suckled by her calf or her

milk removed by another calf or by milking. We conclude that a cow-calf bond and milk removal (either mechanically or by a calf) are essential to prolong anestrus in beef cows.

Table 1. Daily Milk Production Characteristics of Cows during the 4-Week Treatment Period Initiated on Day 15 Postpartum

| Treatment ^a | No. of Cows | Milk (lb) | Fat (lb) | Protein (lb) | Lactose (lb) | SNF ^b (lb) | SCC ^c (x1000) |
|------------------------|-------------|------------------|------------------|------------------|------------------|-----------------------|--------------------------|
| CWM | 6 | 9.2 ^x | .38 ^x | .31 ^x | .43 ^x | .80 ^x | 95 |
| CRM | 5 | 18.3 | .81 | .62 | .94 | 1.66 | 51 |

^aCWM = calf weaned + milked and CRM = calf restricted + milked.

^bSNF = solids-not-fat.

^cSCC = somatic cell count.

^xDifferent (P<.05) from CRM.

Table 2. Daily Milk Production Characteristics of Cows 1 Week after Termination of Treatments

| Treatment ^a | No. of Cows | Milk (lb) | Fat (lb) | Protein (lb) | Lactose (lb) | SNF ^b (lb) | SCC ^c (x1000) |
|------------------------|-------------|-------------------|------------------|------------------|------------------|-----------------------|--------------------------|
| CWM | 6 | 7.5 ^x | .11 ^x | .30 ^x | .44 ^x | .82 ^x | 57 |
| CRM | 5 | 14.8 ^y | .39 ^y | .49 ^y | .74 ^y | 1.35 ^y | 113 |
| CPO | 5 | 14.8 ^y | .36 ^y | .46 ^y | .73 ^y | 1.29 ^y | 122 |

^aCWM = calf weaned + milked, CRM = calf restricted + milked, and CPO = own calf present.

^bSNF = solids-not-fat.

^cSCC = somatic cell count.

^{xy}Means within a column without common superscripts differ (P<.05).

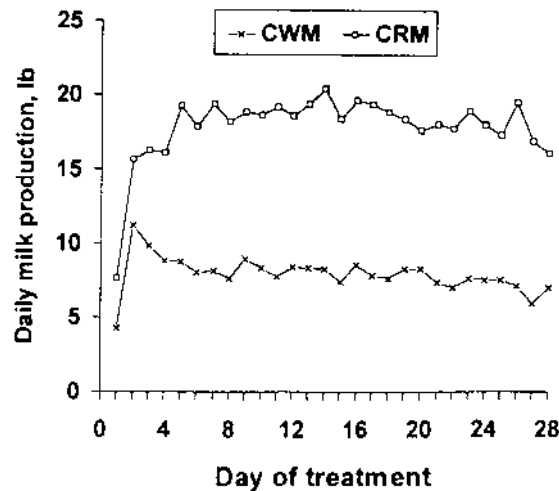


Figure 1. Daily Milk Production for Six CWM (Calf Weaned + Milked) and Five CRM (Calf Restricted + Milked) Cows during a 4-week Treatment Period Initiated on Day 15 Postpartum