—Research Note—

**Effects of suckling on the interval from calving
to uterine involution in beef cows**

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Interval from calving to involution of uterus is a important factor determining the fertility¹⁻³⁾. It has been made clear that the interval to uterus involution is affected with calving number or aging^{4,5)}, but the influences of the other factors are almost unknown. CASIDA⁶⁾ suggested that suckling of a calf or 4 times a day milkings hastened uterine involution in dairy cows.

The present study was carried out to investigate the effect of suckling on uterine involution in beef cows.

Materials and Methods

A total number of 16 Japanese Black cows, calving numbers of which were from the 1st to the 10th, were used. Out of 16 cows, 8 cows weaned their calves without any suckling and milking just after calving and the other 8 cows were allowed to suck with their calves *ad libitum*. The number of suckled and non-suckled cows was the same at each calving number and their average calving number was 5.3.

Uterus was examined regularly by rectal palpation twice a week after 4 or 5 postpartum days and existence of lochia was observed by using of the vaginal speculum. Interval from

calving to involution of uterus was judged as its end point when uterus returned to its normal and non-pregnant position, and pregnant horns showed similar values in diameter and length according to the criteria described by HIGAKI *et al.*⁷⁾. Diameter of post gravid horn was indicated by width in finger, and one width in finger was about 1.5-2.0 cm in this study. Degree of the diameter of uterus accompanying postpartum days which was indicated by involutionary progress curve of uterus was calculated by the fitting of orthogonal polynomials from a general recurrence formula by using NISHIDA's computer program⁸⁾, after transformation of postpartum days into natural logarithm. The involutionary progress curves in suckled and non-suckled cows were determined from 18 and 98 observations, respectively.

Results and Discussion

As shown in Table 1, average days required from calving to uterine involution was significantly ($P<0.05$) longer in non-suckled cows than suckled ones. In suckled cows, these values were similar to those reported in other papers^{4,5,9)}. The longer time span required for uterine involution by the increase of calv-

Table 1. Interval from calving to involution of uterus and disappearance of lochia in suckled and non-suckled beef cows

Experimental group	Calving No.	No. of cows	Involution of uterus (days)	Disappearance of lochia (days)
Non-suckled	1	2	39.5*	14.0*
	2- 5	2	44.5	15.5
	6-10	4	48.3	17.7
	(total)	8	43.6±3.4 ^a	16.0±2.2
Suckled	1	2	31.5	15.0
	2- 5	2	37.5	14.0
	6-10	4	40.5	20.0
	(total)	8	37.5±5.8 ^b	17.3±4.0

* Mean ^{a, b} $P < 0.05$

ing number were recognized similarly in both experimental groups. Average interval from calving to disappearance of lochia was almost the same in both experiments and was not related to the difference of calving number. It has been suggested by OXENREIDER¹⁰⁾ that interval to uterine involution was not influenced by suckling. However recently, OKANO *et al.*¹¹⁾ reported that uterine samples of beef cows which weaned their calves just after calving and were slaughtered at 44 days postpartum showed less involutionary signs than suckled ones. These results also showed that the interval in days from calving to uterine involution was affected by suckling stimulus.

The involutionary progress curves of uterus were calculated in order to make clear the changes of the involutionary patterns of uterus for days after calving at suckled and non-suckled treatments. In orthogonal polynomials shown by cubic equation, highly coefficient of determination (0.9349 at suckled, 0.9463 at non-suckled) were obtained. The values of regression coefficient in suckled cows were similar to the previous paper³⁾.

The involutionary progress curve of uterus accompanying the postpartum days and orthogonal polynomials are shown in Fig. 1. The average diameter of post gravid horn for

A=non-suckled cows

$$Y = -11.0884 + 21.1599 \ln X - 8.1472 (\ln X)^2 + 0.9124 (\ln X)^3 \quad (r^2 = 0.9463)$$

B=suckled cows

$$Y = -6.4303 + 17.0611 \ln X - 7.2519 (\ln X)^2 + 0.8777 (\ln X)^3 \quad (r^2 = 0.9349)$$

Fig. 1. Involutionary progress curves of uterus in suckled and non-suckled beef cows. Each data point represents the mean post gravid horn diameter for all cows examined that day (●=non-suckled, ○=suckled).

all cows observed each postpartum days are also represented. According to the involutionary progress curves, the diameter of post gravid horn at 10, 20 and 30 postpartum days in suckled cows were 5.1, 3.2 and 2.2 width

in finger, respectively. The decrease in values from 7 to 20 postpartum days were relatively rapid compared with the later days. The involutionary pattern was almost similar to HIGAKI *et al.*⁷⁾, SUGA⁹⁾ and TENNANT *et al.*¹²⁾ in dairy cows and previous paper³⁾ in beef cows. In non-suckled cows, the diameter of post gravid horn at 10, 20 and 30 postpartum days were 5.6, 3.7 and 2.5 width in finger, respectively. Their decreasing values were almost the same as suckled cows after 11 postpartum days and the involutionary pattern was not so remarkably changed as suckled cows. However, the decreasing values from 7 to 10 postpartum days in non-suckled cows were small compared with suckled ones, therefore, the diameter of post gravid horn in non-suckled cows was larger than the suckled cows. Consequently, it was supposed that the stimulation of suckling was not absolutely necessity for uterine involution, but, the degree of uterine involution could be accelerated with the stimulation of suckling in the early stage of postpartum days.

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肉用牛における哺乳の有無が分娩後の子宮修復に及ぼす影響

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哺乳刺激が肉用牛の分娩後の子宮修復に及ぼす影響を調べる目的で、初産から 10 産の黒毛和種計 16 頭を用いて試験した。8 頭は分娩後直ちに産子を離乳し、無哺乳区とした。他の 8 頭は産子に自由に哺乳させ、自然哺乳区とした。両試験区の各産次における供試頭数は同一とし、平均 5.3 産であった。子宮修復の状態は 3~4 日間隔で直腸検査により調べた。

子宮修復までの日数は無哺乳区および自然哺乳区で各

々 43.6 ± 3.4 日, 37.5 ± 5.8 日 (平均 $\pm$ 標準偏差) であり、その差は有意であった。子宮角幅の大きさの変化を直交多項式に当てはめて分析した結果、子宮修復のパターンに大きな違いは認められなかったが、無哺乳区では自然哺乳区に比べ子宮角幅の減少が、とくに 10 日目頃まで小さい傾向が認められ、修復の程度も遅れる傾向にあることが示唆された。以上の結果、哺乳刺激は子宮修復に対し、促進効果があることが示唆された。