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Behavioral changes of suckler beef calves in grazing cow-calf herd

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Abstract

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Behavioral changes of suckler beef calves in cow-calf herd on grazing pasture was studied. Three Hereford-breed female calves, born in February, March and April, respectively, were observed through 24 hr at once a month from May to October. The animals were kept with 40 cows and 30 calves in a rotational grazing system. Through behavioral observation, their suckling, eating, lying and chewing behavior were recorded continuously.

Mean time budget of suckling through the observation period 40.5 min./24hr, and had a tendency to decrease from 2 to 7 months old of calves. Time-interval between each suckling, of which mean was 6.11 hr/24hr through observation, tended to increase through the period, while frequency of suckling, was 4.2 times/24hr as a mean through the observation, did not change so much. Time budgets of eating and chewing of calves increased through the observation, while lying time of calves tended decreasing in this period. Time budgets of eating and chewing were attained to more than 80% of those of cow behavior at 6 months of age of calves, and lying were 112% of cows lying-time at 6 months of age. Certain behavioral patterns of eating and lying of calves were observed from 3 months of age and after. Behavioral patterns of calves were synchronizing with the patterns of cow-group after 5 months old of calves ($r=0.80$, $P<0.01$). Until 3 months of age, most suckling occurred when calves were in resting-phase, thereafter suckling mainly occurred in a trance-phase, which was time occasions between behavioral phases of eating and resting.

Key words : Grazing, Beef, cow, calf, behavior

Introduction

After the new grouping of calves which were reared artificially from their birth, calves synchronized their behavioral pattern on the day 3 after grouping³⁾. In a group of cow-calf herd on pasture, calves were growing up outdoors with their mother-cows on pasture through grazing period until weaning. Through this period, calves had to change their nutritional sources from milk to grass and obtain the grazing pattern of behavior like as a grazing cow-group was doing. Thus, the behavioral changes in this period was one of the important element of growth performance of beef calves as well as the milk yield of mother-cows. The milk production of beef-cows and its influences on calf-behavior have been studied genetically⁹⁾, while a development of other maintenance behavior of calves on pasture was studied on only range cow-calf groups^{2, 5)}. Also the development of social behavior between calves on pasture was studied^{6, 7, 11)}, though there was few studies concerning a change of their grazing behavior on pasture.

In this study, suckler beef-calves on pasture with their mother-cows were studied through their grazing season, and changes of suckling, eating and resting behavior was recorded. Results were discussed on the view points of comparison of behavior between calves and cows.

Materials and methods

Experimental animals were 3 sets of calf-cow pair in a Hereford-breed herd of 40 cows and 30 calves grazed on pasture rotationally from May to November in the Livestock Farm of Hokkaido University. Experimental calves were all female, born in February, March and April, respectively, and their mean body weight at calving was 37.7kg. Cows were 6 to 7 year old and their mean body weight at May was 669.7kg. They were grazed 7 to 10 pasture paddocks rotationally. The behavioral observation was conducted through 24 hr in each month from May to October at a paddock of 3.8 ha. In each observation, a start and end time of following behavior was recorded for each experimental calf and cow continuously through 24 hr ; eating grass, lying, chewing and suckling.

Results and discussion

Daily body-weight gains of experimental calves through grazing period were 0.80, 0.84 and 0.90 kg/day, respectively, and body-weight changes of experimental cows were little. The ages of calves were 1, 2, 3, 4, 5, 6, 7 and 8 of months in each observation

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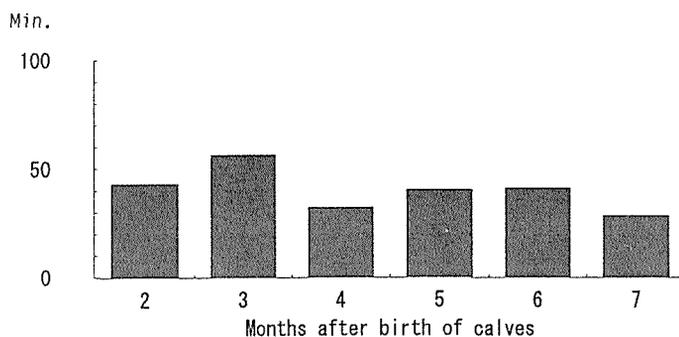


Fig. 1. Change of time budget of suckling (min./24 hr) in calves from 2 to 7 months of age after birth.

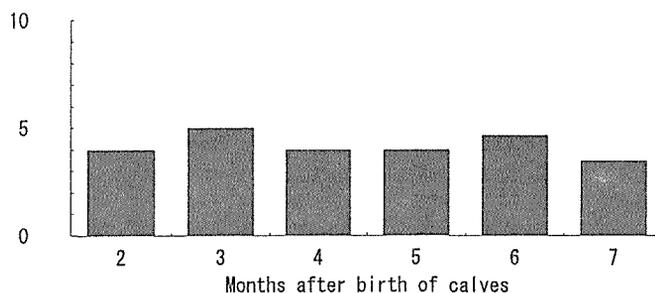


Fig. 2. Change of frequency of suckling by calves in each 24 hr from 2 to 7 months of age after birth.

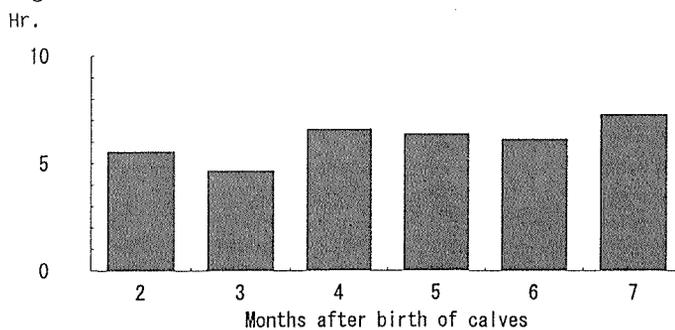


Fig. 3. Change of time-interval (hr) between each suckling of calves in each 24 hr from 2 to 7 months of age after birth.

month. From 2 to 7 months of age, 2 and more calves were observed in each observation, though there was only one behavioral sample for the calf of 1 month of age at May, and 8 months of age at October. Therefore, these two age of months were deleted from the means of tables and figures.

Fig. 1 shows changes of mean time budgets of suckling of calves from 2 to 7 months of ages. The mean of them was 40.5 min./24 hr, and had a tendency of decreasing from 2 t

o 7 months old. Time budgets of suckling for months 1 and 8 of age in calves were 63.9 and 36.1 min./24 hr, respectively. In the breed of Japanese black beef, their milk production showed a peak at 30 days after calving and then decreased, and time budgets of suckling of calves was changing with these changes of milk production⁸⁾. In this study, the milk yield of experimental cows was not measured, but it would be almost similar to that of Japanese Black cows and changes of suckling time of calves would be also related with cows milk yield.

Figs. 2 and 3 show changes of frequency of suckling and time-interval between each

Table 1 Proportion (%) of behavioral time budget of calves to that of cows

	Month of age in calves					
	2	3	4	5	6	7
Eating	42.6	45.5	59.9	67.4	85.2	80.1
Lying	130.6	124.5	125.4	115.9	111.7	110.5
Chewing	58.1	62.3	72.4	70.6	87.6	102.9

suckling from 2 to 7 months old. Frequency of suckling /24hr was not changing so much, was ranged between 4 to 5 times. Time-interval between each suckling had a tendency of increasing, though it was not so obvious increasing as other studies^{1, 5, 9)}. The difference of results between this study and others would be depended on the procedure and situation of each experiment. In other studies, the milk yield of cows were measured by body-weight difference methods, which would inhibit natural behavior of calves and cows. Additionally, studies conducted in confinement and/or barn^{4, 8)} would obtained different results of time budgets of eating and resting from the study done on pasture. On the other hand, for calves on grazing pasture, Walker¹⁰⁾ reported that frequency of suckling were 3 to 5 times, and not change so greatly to weaning, as similar as this study. The results of this study and study by Walkerr¹⁰⁾ suggested that suckling behavior of calves on grazing pasture with their mother-cows did not change so rapidly, in spite of changes of their cows milk production changes.

Time budgets of eating and chewing of calves increased through the observation, from 3.7 hr to 6.9 hr and 4.2 hr to 7.5 hr, respectively, while lying time was decreasing from 14.1 hr at 2 months old to 12.5 hr at 7 months old. Table 1 shows proportion of time budgets of eating and lying behavior of calves to those of their mother-cows. At 2 months old, eating grass in calves occupied only 42.6% of hr of cows and lying of calves was over

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Table 2 Mean coefficient of correlation between behavioral pattern of calves and cows

	Month of age in calves					
	2	3	4	5	6	7
Eating	0.42	0.70	0.77	0.86	0.73	0.83
Lying	0.69	0.75	0.79	0.82	0.73	0.87

130% of that of cows. Eating behavior of calves attained over 80% of cows at 6 months old, and there was no statistical difference between them after 6 months of ages (t test). The lying behavior of calves decreased to 115% at 5 months old, thereafter no statistical difference was obtained between calves and cows (t-test). Thus, eating and lying behavior of calves could attained to adult level after 5 to 6 months of age on grazing pasture when they were grazed with their mother-cows.

Experimental cows showed typical eating and lying pattern as a grazing herd, that is, big meals were observed at both dawn and dusk then some of supplement form of grazing were occurred in night and daytime. Table 2 shows coefficients of correlation between behavioral pattern of calves and cows. After 3 months old, the correlation coefficients (r) were over 0.70 ($P < 0.01$). Calves could be performing and synchronizing their behavioral pattern with their mother-cow group after 3 months old.

Fig. 4 shows proportion of categories of behavioral phase when calves was starting their suckling, that was, eating-suckling-eating (eating phase), eating-suckling-resting and/or resting-suckling-eating (trans-phase) and resting-suckling-resting (resting phase). From 2 to 4 months old, calves started their suckling when they were in resting phase and

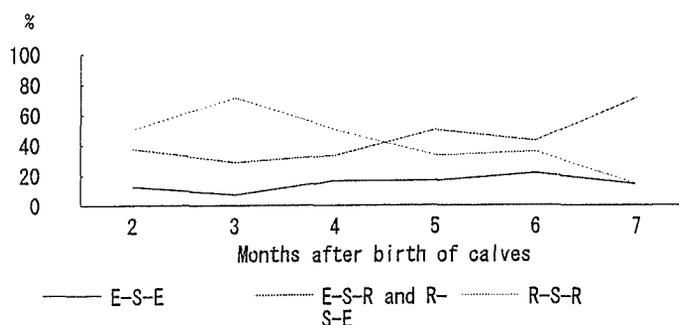


Fig. 4. Proportion (%) of categories in which behavioral phase calves were suckling to total occasion. E-S-E: eating, suckling and eating, E-S-R and R-S-E: eating, suckling then resting and/or resting, suckling then eating, R-S-R: resting, suckling and resting by calves.

after suckling they returned to rest again. After 5 months of age in calves, they were suckling between behavioral phases of grazing and resting. Calves with cows on pasture made sub-group as a creche. they were behaving separately from cows group sometime. In such creche formation, suckling were occurred when animals were changing their behavioral phase between grazing and resting¹⁰. Creche would be observed at least at 3 months of age⁶⁾, though calves would not behave simultaneously with cow-group up to 5 months old. After 5 months of ages, calves were eating and lying with cows in synchronizing, and suckling between changing behavioral phases.

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放牧肉用繁殖牛群内の哺乳子牛の行動の変化

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要 約

近藤誠司・十二邦子・河合正人・小川貴代・安江 健・秦 寛・大久保正彦・朝日田康司 (1997) 放牧肉用繁殖牛群内の哺乳子牛の行動の変化, 北大農学部牧場研究報告16: 29~35

放牧肉用牛群内で自然哺乳されている子牛の哺乳期間中の行動の変化について観察した。供試牛は2, 3および4月生まれのヘレフォード種雌子牛3頭であり、母牛とともに成雌牛40頭および子牛30頭群として、5月から11月まで北海道大学農学部附属牧場の蹄耕法造成の草地で輪換放牧した。行動観察は5月から10月まで各月1回24時間連続で行い、供試子牛の月齢2, 3, 4, 5, 6, 7ヵ月について、時間内に見られた吸乳行動、採食行動、横臥行動、反芻行動を記録した。

吸乳時間の全平均は40.5分/24hrで、月齢とともに減少する傾向にあった。また日内の各吸乳行動の間隔は平均で6.1時間で2から7ヵ月齢にかけて減少する傾向にあった。一方、1日の吸乳回数は平均で4.2回であり、全期間を通じて4~5回と、大きな変化はなかった。子牛の採食時間および反芻時間は期間を通じて増加する傾向にあり、6ヵ月齢でどちらも母牛の平均採食および反芻時間の80%に達し、有意な差はなくなった(t検定)。横臥時間は逆に月齢とともに減少する傾向にあり、6ヵ月齢で112%と母牛の横臥時間との間に有意な差はなくなった(t検定)。供試子牛の各行動は比較的早い時期から一定のパターンが観察され、子牛と母牛の行動型は3ヵ月齢から相関係数0.7 ($P < 0.01$) 以上の高い相関を示し、この時期から母子の行動型が斉一化する傾向にあることが示唆された。吸乳前後の子牛の行動から、放牧地における哺乳子牛は4ヵ月齢までは休息中に吸乳を行い、その後再び休息に戻る割合が高いが、5ヵ月齢以降では採食行動から休息行動への移行時もしくは休息行動から採食行動への移行時に行われる比率が高くなった。