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On the suckling behaviour of Alpine chamois *Rupicapra rupicapra rupicapra*

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Abstract

The suckling behaviour of 9 mother-kid pairs of alpine chamois (*Rupicapra rupicapra rupicapra*) was studied from May to October 1991. Duration of suckling bouts decreased with age of the young, from a mean of 48 sec in the first month, to 22 sec in October, whereas the time between suckling increased from 25 min to over 160 min. Suckling success (number of successful suckling attempts over all attempts) of the young decreased from the first month up to the time when the young were weaned. Suckling was always terminated by the mother (except 2 times). After the third month of life, mothers only allowed suckling by their kids from the side. Each suckling attempt from behind was rebuffed.

Introduction

Lactation is of fundamental importance for young mammals, for growth and building up body reserves (Clutton-Brock 1982). While the young attempt to obtain as much parental care (e. g. milk) as possible, mothers are selective in maximising the difference between the benefit and cost of parental care. If they invest too much in their current offspring, it may decrease their chances of survival and the number of future offspring (especially when the females are young). This asymmetry of benefits and costs between mothers and young gives rise to a parent-offspring conflict over the amount and termination of parental investment (Trivers 1985). Studies on ungulates indicate that the young attempt to suckle as long as possible, while mothers increasingly refuse to suckle them (e. g. Berger 1979; Clutton-Brock 1982). Moreover, it could be of some importance from which position (i. e. from behind or from the side) a kid attempts to suckle.

In chamois, no detailed study is yet available describing the suckling behaviour of females and kids for the entire lactation period.

The aim of the present study was to investigate the suckling behaviour of mothers and kids over the entire suckling period: the duration and frequency of suckling bouts and the suckling success rate of the kids. Furthermore, it was of interest to determine who terminates such suckling bouts and if mother and kid agree or differ in their preference of suckling positions.

Material and methods

Study area and animals

Nine individually marked female chamois and their kids were observed on 70 days (617 hours) between May and October 1991, in the region of Augstmatthorn, Bernese Oberland, Switzerland. The study site lies within the borders of an area where hunting is prohibited. Chamois were captured in a wooden trap (with salt as bait) and individually marked with yellow-coloured plastic stripes glued around their horns. Females with their young spent most of their time on grassy slopes at an altitude between 1400 and 2137 m a.s.l. with only little tree cover, where they could be easily observed (Ingold and Marbacher 1991).

Time of birth was estimated to be mid-way between the last observation, that a female was seen without a kid and the first day when she was observed with it. Kids were not marked, but as female

chamois only suckle their own kids (KRÄMER 1969), it was possible to determine which kid belonged to each marked female.

The sex of the kid was determined through the kid's position while urinating (Tab. 1).

Data on suckling behaviour were collected from an observation point where most of the slope used by the chamois during daytime was visible. Observations were made with a spotting scope (30 × 60) and binoculars (10 × 40).

Table 1. **Age of female Alpine chamois in years, sex and date of birth of young and observation time of each mother-kid pair (in days and hours visible), at the Augstmatthorn, Switzerland, 1991**

Age of female	Date of birth	Sex of kid	Days of observation	Hours
5	08.–20. May	f	9	39
5	21.–26. May	f	10	55
5	08.–20 May	m	16	79
7	20.–22. May	f	12	69
8	08.–20. May	f	13	81
8	08.–20. May	f	17	93
8	03.–12. June	f	12	61
11	08.–20. May	f	11	48
13	08.–20. May	m	15	92

Data collection

Each mother-kid pair was observed for 9 to 17 days, depending on their presence and visibility. If several marked females were visible at the beginning of data collection, the female with the least observation days or hours was chosen as focal animal. Data on suckling behaviour were collected with the focal animal-continued sampling method. Durations of suckling bouts for females that were not focal animals were collected ad libitum (ALTMANN 1974).

Duration of suckling bout was measured as the time from the first contact of the kid with the udder, until the kid itself or the mother terminated the suckling. Suckling bouts were timed to the nearest second.

During a suckling bout the kid was either in contact or pulled at the udder. Suckling attempts were considered successful, when they lasted more than 5 seconds. Attempts where no contact was made with the udder, or bouts where the contact was shorter than 5 seconds, were treated as unsuccessful suckling attempts. A kid's suckling attempt was rejected, when the female did not allow it to suckle or even approach the udder. Time between suckling bouts was measured in minutes from the end of the last successful suckling bout until the commencement of the next bout.

Suckling success was calculated from the number of successful suckles divided by the number of all suckling attempts.

The position of the kid relative to the mother during suckling was recorded after each suckling bout or attempt.

Statistical analysis

Mean duration of suckling bouts and time between suckling were calculated separately for each mother-kid pair for the first six months of life of the young.

Differences in duration of suckling bout and time between suckling (dependent variables) were tested with a 2-way ANOVA (ZAR 1984) according to individual variation and age of the kids. Age of the kids and individual differences were treated as independent variables.

Suckling success: the mean suckling success was calculated (for each kid) for each month of life and tested with a Spearman rank correlation coefficient.

Results

The duration of suckling bout decreased with age of the young (Fig. 1; 2-way ANOVA; $F = 63.77$, $df = 1$, $p < 0.001$). Differences in suckling duration between individuals had no influence on the decrease in suckling duration over the months observed ($F = 1.01$, $df = 8$, $p = 0.44$).

Although suckling was observed occasionally in October, it did not occur in November and after the rut (4 days of observation).

The time between suckling bouts increased during the first 5 months of the kids' life (Fig. 2; 2-way ANOVA; $F = 33.24$, $df = 1$, $p < 0.001$). Individual differences had no influence on the average increase in time between suckling bouts ($F = 0.99$, $df = 8$, $p = 0.47$).

Kids either suckled from the side (their body antiparallel to their mothers') or from behind (Tab. 2). They butted the udder 3 to 5 times before holding their heads still and

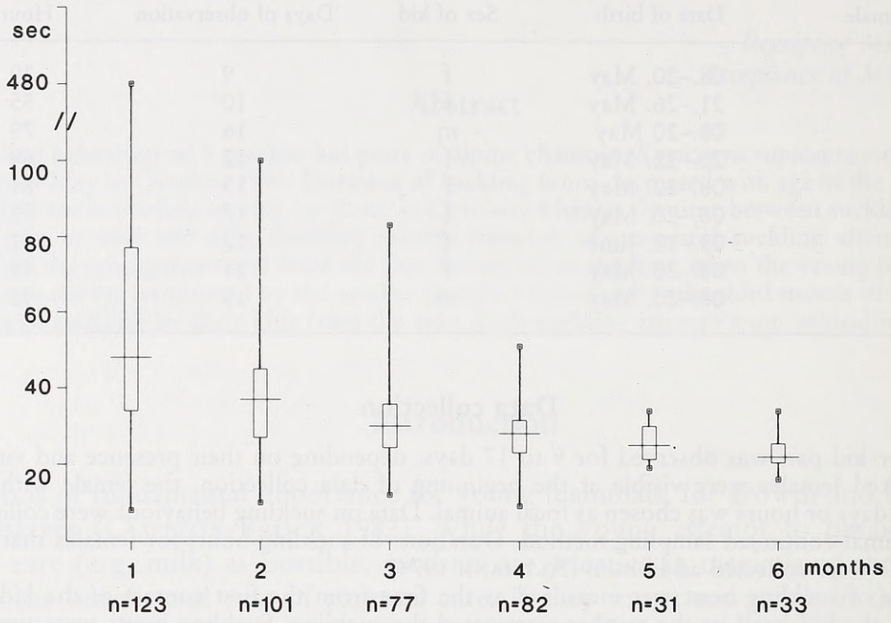

Fig. 1. Duration of suckling bouts in the first six months of life for Alpine chamois at the Augstmatthorn, Switzerland, 1991. (Mean, minima, maxima, 1st +3rd quartile). Data of 9 mother-kid pairs

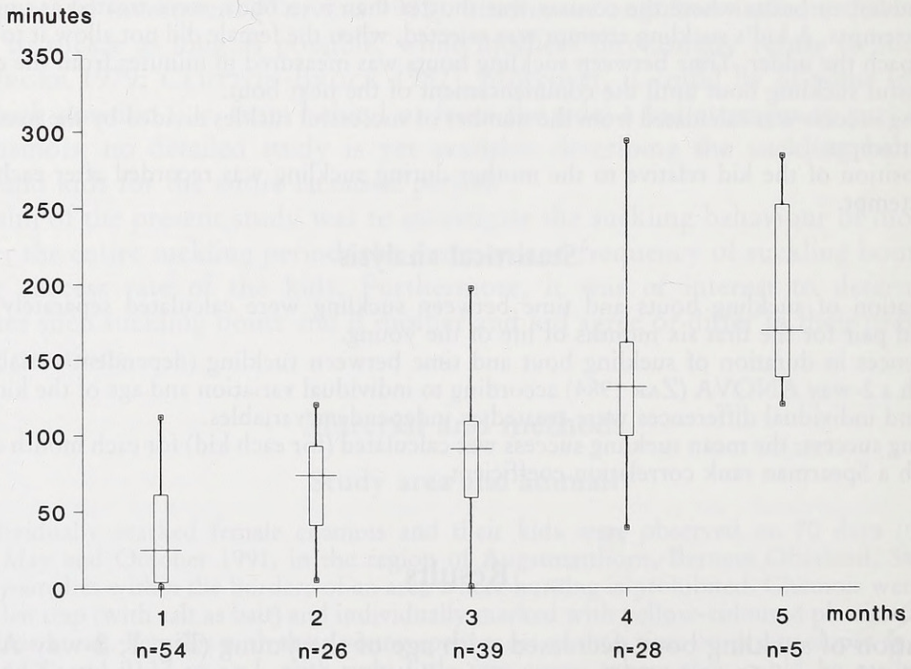

Fig. 2. Time between suckling bouts in the first 5 months of life of Alpine chamois at the Augstmatthorn, Switzerland, 1991. (Mean, minima, maxima, 1st +3rd quartile). Data of 9 mother-kid pairs

Table 2. **Number of successful or unsuccessful suckling attempts from the "side" or "from behind" position**

Data from Alpine chamois at the Augstmatthorn, Switzerland, 1991. Data of 9 mother-kid pairs

Age in months	1		2		3		4		5		6	
Position	s	b	s	b	s	b	s	b	s	b	s	b
Total attempts	163	77	69	42	92	88	91	41	28	24	31	12
% successful	71	51	79	17	68.5	2	66	0	82	0	42	0
% unsuccessful	29	49	21	83	31.5	98	34	100	18	100	58	100

b = from behind; s = from the side.

suckling. During the first months 75 % of the successful bouts were from the side. In the second and third months, 88 % and 97 % of all successful sucklings were from the side. After the third month of life, suckling attempts from behind were always rejected by the mother.

Suckling success in general decreased with the age of the kids (Fig. 3; Spearman Rank correlation coefficient; rs = 3.64 N = 40, $p < 0.05$).

Suckling was always terminated by the mother (n = 474) except in May, when 2 kids interrupted the suckling themselves (n = 2 out of 163 suckling bouts; 9 individuals were observed for a total of 40 hours).

In May, kids sometimes were observed attempting to suckle from mothers other than their own, but each of these attempts was rebuffed by the females, either by walking away or by butting the kid away.

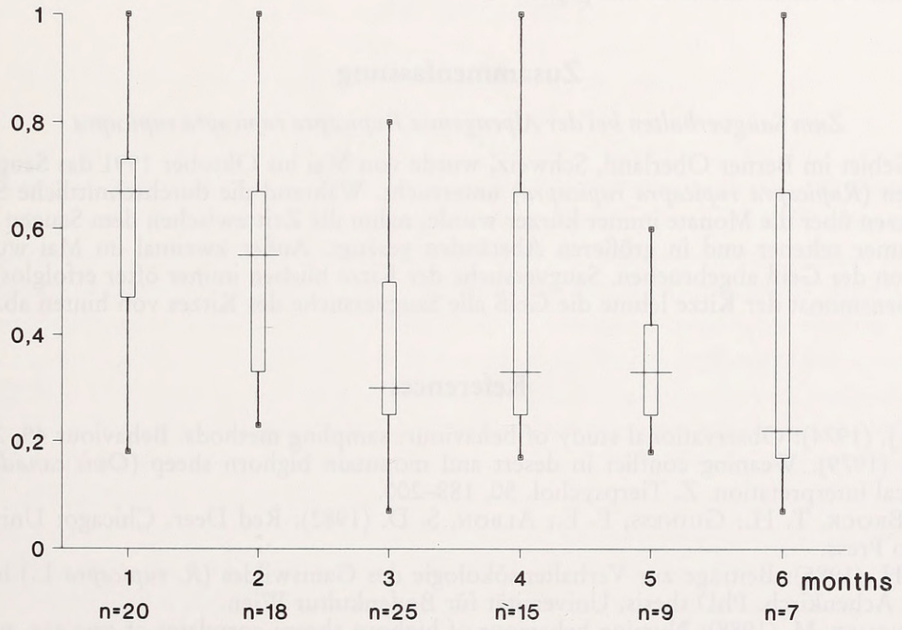

Fig. 3. Suckling success (number of successful suckling attempts over all attempts) of chamois kids during the first 6 months of life at the Augstmatthorn, Switzerland, 1991. (Mean, minima, maxima, 1^{st} +3^{rd} quartile), n = total number of suckling attempts. Data of 9 mother-kid pairs

Discussion

The decrease in duration of the suckling bout, frequency and success is very similar to those described in other studies on ungulates (red deer: Clutton-Brock 1982; bighorn sheep: Berger 1979; Festa-Bianchet 1988; bison: Green 1986). As the young grow older, they appear to receive less milk and are admitted to the udder less often. In spite of being rebuffed the kids try to gain access, and after the 4th month of life the total number of suckling attempts decreases. Weaning in chamois is a gradual process, with little conflict between mother and young, and aggressive behaviour by the young was never observed, as in monkeys (Gomendio 1991; Goodall 1990; Trivers 1974, 1985) towards the mother when refused to suckle. Kids simply attempt to suckle again, after being rebuffed, or wait for another opportunity. The mother decided how long and when she wanted to suckle her kid. The probability of a kid suckling successfully not only depended on the frequency and duration of suckling bouts but also on the kid's position towards the udder during suckling attempts. Approaches from the side were more successful. After the third month of life, all suckling attempts from behind were rejected by the mother. It probably was easier for the mother to keep on walking when the kid attempted to suckle from behind. When it tried to suckle from the side, the female had to lift her leg and step over her young. Perhaps the mother also had better control (visible and olfactory) over the kid who wanted to suckle, when it approached her from the side. Mother and kid therefore not only differed in their interest in the duration and frequency of suckling bouts but also in their preference of the suckling position.

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Zusammenfassung

Zum Saugverhalten bei der Alpengemse Rupicapra rupicapra rupicapra

In einem Gebiet im Berner Oberland, Schweiz, wurde von Mai bis Oktober 1991 das Saugverhalten von Gemsen (*Rupicapra rupicapra rupicapra*) untersucht. Während die durchschnittliche Saugdauer bei den Kitzen über die Monate immer kürzer wurde, nahm die Zeit zwischen dem Saugen zu. Kitze wurden immer seltener und in größeren Abständen gesäugt. Außer zweimal im Mai wurden alle Saugakte von der Geiß abgebrochen. Saugversuche der Kitze blieben immer öfter erfolglos. Ab dem dritten Lebensmonat der Kitze lehnte die Geiß alle Saugversuche des Kitzes von hinten ab.

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