

## Observation of a Birth Among Wild Toque Macaques (*Macaca sinica*)

Amodha P. Ratnayeke<sup>1</sup> and Wolfgang P. J. Dittus<sup>2,3</sup>

Received April 28, 1989; revised October 17, 1989

---

*Most toque macaques give birth to their infants during the night when resting arboreally. Here we report on a birth that occurred in daytime (at 0916 hr) and on the ground. The mother was 7.6 years old; the birth was her second. Prepartum behaviors included lordosis, arching of the back, stretching, squatting, rolling on the ground, and anogenital self-examination. During the birth the female was isolated about 100 m from the rest of her group. The mother stood bipedally during parturition and assisted delivery with her hands. The infant was born within 2 min after first appearing at the vulva. It immediately clung to the mother's leg and vocalized. The mother licked the infant and oriented it toward her ventrum. She resumed foraging behavior within 20 min after parturition. The infant nursed for the first time 2.25 hr after being born. The mother ate part of the placenta, but the alpha female of the group usurped and also ate a portion of it. Curious group members sniffed and looked at the infant but did not touch it.*

---

**KEY WORDS:** *Macaca sinica*; parturition; behavior; neonate; mother-infant.

### INTRODUCTION

The aim of this report is to describe the birth of an infant toque macaque *Macaca sinica* that occurred in the wild, at Polonnaruwa, Sri Lanka. The birth was unusual because it occurred during daytime and on the ground.

<sup>1</sup>Department of Zoology, University of Colombo, Colombo, Sri Lanka.

<sup>2</sup>National Zoological Park, Smithsonian Institution, Washington, D.C. 20008, and Institute of Fundamental Studies, Kandy, Sri Lanka.

<sup>3</sup>To whom correspondence should be addressed.

The behavior of the pregnant female therefore was easily observed before, during, and after the birth.

There are no published reports of births for macaques in the wild, and those for other primates are few. The latter include gorillas, *Gorilla gorilla* (Steward, 1977), chimpanzee, *Pan troglodytes* (Goodall and Athumani, 1980), orangutans, *Pongo pygmaeus* (Galdikas, 1982), red howler monkeys, *Alouatta seniculus* (Sekulic, 1982), gray langurs, *Presbytis entellus* (Oppenheimer, 1976), baboons, *Papio anubis* (Nash, 1974), *Papio hamadryas* (Abegglen and Abegglen, 1976), and *Papio cynocephalus* (Altmann, 1980), and geladas, *Theropithecus gelada* (Dunbar and Dunbar, 1974).

However, several descriptions of parturition behavior are available for captive macaques, as well as other primates. These include stump-tail macaques, *M. arctoides* (Gouzoules, 1974), Java macaques, *M. fascicularis* (Kemps and Timmermans, 1982), rhesus, *M. mulatta* (Adachi *et al.*, 1982; Brandt and Mitchell, 1971, 1973), colobus, *Colobus guereza* (Wooldridge, 1971), squirrel monkeys, *Saimiri sciureus* (Bowden *et al.*, 1967), baboons, *Papio anubis* (Love, 1978), and gorillas, *Gorilla gorilla* (Beck, 1984).

## METHODS

### Study Area and Subjects

The study was done on the population of toque macaques living in the Nature Sanctuary and Archaeological Reserve at Polonnaruwa, Sri Lanka. This population has been under continuous study since 1968. The natural dry evergreen forest, which the macaques inhabit, as well as several aspects of macaque behavior and demography were described earlier (Dittus, 1977, 1985).

### Individuals and Age Classes

Toque macaques are highly variable in their individual morphologies. Standard drawings and descriptions (identification cards) were made for each individual in the population. Classification of macaques into age-sex classes follows Dittus and Thorington (1981). Females are adult after their first birth at about 6 years of age.

### Behavioral Sampling

Behaviors were recorded using both ad libitum notes and focal-animal sampling techniques (Altmann, 1974). Activity states were recorded at 1-min

intervals and included foraging (the search for and consumption of food), resting, sleeping (resting with eye closed), moving (independent of the search for food), nursing, and grooming. Such activities were summarized as total durations per observation period.

Behaviors occurred either as discrete acts, such as examining the ano-genital region, or as a set of related acts, such as squatting, stretching, and arching the back. Such sets were summarized in terms of discrete events, which were considered as independent of one another if they occurred with a break of 1 min or more between them. Behavioral acts and events were summarized as frequencies.

### Definitions: Phases of Birth

In keeping with earlier work on other primates (e.g., Brandt and Mitchell, 1973; Kemps and Timmermans, 1982), the observations surrounding the birth of a toque macaque were divided into four phases.

*Prepartus phase*: includes the total period of labor, except the last 5 min before birth.

*Prepartus*: the last 5 min before birth.

*Partus*: delivery of the infant.

*Postpartus*: the period following the birth up to the separation of the placenta from the infant.

## RESULTS

The observations concern a single birth to a female, Sellam, of social group D (group size = 53). She was 7.6 years old and ranked in the lowest fifth of the adult female dominance hierarchy consisting of 15 females. The new infant was her second birth. It was born on February 16, 1985, at 0916 hr, while the rest of the social group was engaged in normal foraging in the forest. The neonate was female and appeared normal and healthy at birth. It survived to the age of 0.59 year, which is not unusual for this population, since about 33% of infants die during their first year (Dittus, 1975). There was nothing obviously atypical about the mother or infant to suggest a day-time birth.

### Prepartus Phase and Prepartus

The onset of labor was unknown. Ad libitum behavioral notes were started at 0820 hr, however, because the female was known to be pregnant and she exhibited unusual postures suggestive of an impending birth.

The preparturition postures included mostly lordosis, arched back, stretching, rolling on the ground, crouching, and squatting in a generally

**Table I.** The Frequencies of Behaviors of Female Sellam, at Different Times During the Prepartus Phase and Prepartus

Birth phase	Time	Behavior			
		Parturition postures	Defecate	Vocalize	Anogenital investigation
Prepartus phase	0820-0829	2			
	0830-0839	3			
	0840-0849	6	1		
	0850-0859	2			
	0900-0909	3		1	
Prepartus	0910-0914	2			2

restless manner. She assumed these postures while staying more or less at one place. Bouts of performing these postures were intermittent, alternating with brief periods of resting and moving. The frequency of posturing was fairly evenly distributed in time during these phases (Table I). She vocalized only once with quiet grunts.

The female investigated her own anogenital area by touching her vulva and sniffing and licking the discharge off her fingers. This behavior was confined to shortly before birth (Table I).

In the hour before giving birth, she followed and kept up with the group's progression but lagged behind at its rear. Group members which approached her included the three highest-ranking females, the alpha male, and two subadult males. One of the females and all of the males sniffed at and visually examined her anogenital region. Two of the females and one of the subadult males also groomed her briefly. In the last 5 min before giving birth she was alone, about 100 m behind the group and out of visual contact with it.

### Partus

The actual process of delivery began at 0915 hr while Sellam was hidden behind a shrub, isolated from her group at more than 100 m. She tugged at her anogenital area as the infant's head appeared at the vulva. She pulled the head with her right hand initially and then used both hands. At approximately 0916 hr the rest of the body was expelled with a gush of fluid. The infant immediately gripped Sellam's thigh and vocalized with a high-pitched sound. The mother held the infant with one hand and the umbilicus with the other, and licked the infant. She adjusted the infant's position so that it clung to her ventrum. The entire delivery occurred rapidly and apparently easily, with the mother in a bipedal standing position on the ground. The infant was always in contact with the mother and was not kept on the ground.

### Postpartus

Focal-animal samples were taken on the mother-infant pair from 0920 to 1214 hr. For the first 18 min after birth, Sellam and her infant were at some distance from other group members; subsequently, she rejoined the group.

During the first 20 min after the birth, the mother frequently licked her infant and the umbilicus. She also tugged at the latter. When the placenta was expelled about 15 to 20 min after birth, she licked and ate part of it. The unconsumed portion of the placenta along with about 20 cm of the umbilicus remained attached to the infant, eventually dried stiff, and dropped off 2 days after birth.

The mother resumed foraging within 15 min after having given birth, and she foraged off and on for the remainder of the observation period. She also groomed her infant in short bouts (Table II). In the 3 hr after birth, the infant sniffed its mother's mouth once and brought its lips to the nipples twice. It suckled for the first time 2.25 hr after birth.

Other group members showed interest in the mother-infant pair by approaching them and looking at the new infant, but not touching it. All inquisitive animals remained 1-2 m from the mother-infant pair.

While Sellam was eating a piece of the placenta, the alpha female (Yasmin) approached and displaced her, and ate the placental piece. With this exception, there was no other overt aggression directed by other group members toward the mother-infant pair. On another occasion, after Sellam had dropped a partially eaten piece of placenta, a juvenile female picked it up and smelled it, but did not eat it.

**Table II.** Activity Budget of the Adult Female Sellam for the First 3 hr After Birth at 0916

Time	Duration of activity (min)				
	Resting	Foraging	Moving	Grooming <sup>a</sup>	Nursing
0920-0949	15	11	4	0	0
0950-1019	19	4	4	3	0
1020-1049	12	12	5	1	0
1050-1119	9	19	2	0	0
1120-1149	6	20	4	0	10
1150-1214	11	4	6	4	4
Total	72	70	25	8	14

<sup>a</sup>Sellam groomed her infant.

## DISCUSSION

Primates generally give birth at night (Jolly, 1972; Brandt and Mitchell, 1971, 1973). Nocturnal births are advantageous because the female and her group are resting, and excessive attention by other group members is avoided. In rhesus macaques, baboons, and squirrel monkeys labor begins at night, and if delivery has not occurred by daybreak, the contractions cease and do not begin again until sundown (Bowden *et al.*, 1967).

Over 1300 births have been recorded among wild toque macaques at Polonnaruwa, and at least 200 of these are known to have occurred at night (unpublished data). The birth discussed here is the first one observed after daybreak, although many more might have occurred. At least two births were known to have occurred in daytime, one of them in the afternoon, but parturition was not observed.

Several features of the observed birth of a toque macaque have been noted in other primates as well. These include, for example, labor postures (Wooldridge, 1971; Brandt and Mitchell, 1971), anogenital investigation and licking and smelling of vaginal secretions by the mother as well as by other females (Kemps and Timmermans, 1982), consumption of the placenta (Brandt and Mitchell, 1971; Nash, 1974; Gouzoules, 1974; Abegglen and Abegglen, 1976; Beck, 1984), and paucity of maternal vocalizations during labor and birth (Brandt and Mitchell, 1973).

Most toque macaque females that were known to have given birth at night generally moved very little the next morning and mostly rested, clutching their infant (Dittus, unpublished). The female discussed here seemed to be unusual because she spent about one-third of her time foraging immediately after having given birth.

Toque macaques sleep in tall emergent trees at night when most births occur. It seemed unusual, therefore, that the observed birth occurred on the ground. The mother was healthy and capable of normal arboreal acrobatic movements.

Normally in toque macaques, more than 80% of all threats (outside the mating season) concern the usurpation of food resources by dominant animals from subordinates (Dittus 1977). The behavior of the alpha female, which took a piece of placenta from the new mother and ate it, although unusual, is nevertheless consistent with the generally competitive nature of macaque society (Dittus, 1988).

## ACKNOWLEDGMENTS

We thank the Office of the President of the Democratic Republic of Sri Lanka for permission to do basic research and, especially, Professor Hilary

Cruz, Department of Zoology, University of Peradeniya, and Professor Cyril Ponnampertuma, Director of the Institute of Fundamental Studies. The research was financed by grants to Dr. W. Dittus from the National Science Foundation (BNS-8300092, BNS-8609665) and the Friends of the National Zoo. Administrative assistance was kindly given by Dr. Devra Kleiman, Assistant Director for Research, National Zoological Park, Smithsonian Institution.

## REFERENCES

- Abegglen, H., and Abegglen, J. J. (1976). Field observation of a birth in hamadryas baboons. *Folia primatol.* 26: 54-56.
- Adachi, M., Saito, R., and Tanioka, Y. (1982). Observation of delivery behavior in the rhesus monkey. *Primates* 23: 583-586.
- Altmann, J. (1974). Observational study of behaviour: Sampling methods. *Behaviour* 49: 227-264.
- Altmann, J. (1980). *Baboon Mothers and Infants*, Harvard University Press, Cambridge, Mass.
- Beck, B. B. (1984). The birth of a lowland gorilla in captivity. *Primates* 25: 378-383.
- Bowden, D., Winter, P., and Ploog, G. (1967). Pregnancy and delivery behavior in the squirrel monkey *Saimiri sciureus* and other primates. *Folia primatol.* 5: 1-42.
- Brandt, E. M., and Mitchell, G. (1971). Parturition in primates: Behavior related to birth. In Rosenblum, L. A. (ed.), *Primate Behavior, Vol. 2*, Academic Press, New York, pp. 177-224.
- Brandt, E. M., and Mitchell, G. (1973). Labor and delivery behavior in rhesus monkeys (*Macaca mulatta*). *A. J. phys. Anthropol.* 38: 519-522.
- Dittus, W. P. J. (1975). Population dynamics of the toque monkey, *Macaca sinica*. In Tuttle, R. H. (ed.), *Socioecology and Psychology of Primates*, Mouton, The Hague, pp. 125-152.
- Dittus, W. P. J. (1977). The social regulation of population density and age-sex distribution in the toque monkey. *Behaviour* 63: 281-322.
- Dittus, W. P. J. (1985). The influence of cyclones on the dry evergreen forest of Sri Lanka. *Biotropica* 17: 1-14.
- Dittus, W. P. J. (1988). Group fission among wild toque macaques as a consequence of female resource competition and environmental stress. *Anim. Behav.* 36: 1626-1645.
- Dittus, W. P. J., and Thorington, R. W., Jr. (1981). Techniques for aging and sexing primates. In Subcommittee on Conservation of Natural Primate Populations (ed.), *Techniques for the Study of Primate Population Ecology*, National Academy Press, Washington, D.C., pp. 81-131.
- Dunbar, R. I. M., and Dunbar, P. (1974). Behaviour related to birth in wild gelada baboons (*Theropithecus gelada*). *Behaviour* 50: 185-191.
- Galdikas, B. M. F. (1982). Wild orangutan birth at Tanjung Puting Reserve. *Primates* 23: 500-510.
- Goodall, J., and Athumani, J. (1980). An observed birth in a free-ranging chimpanzee (*Pan troglodytes schweinfurthi*) in Gombe National Park, Tanzania. *Primates* 21: 545-549.
- Gouzoules, H. T. (1974). Group responses to parturition in *Macaca arctoides*. *Primates* 15: 287-292.
- Jolly, A. (1972). *The Evolution of Primate Behavior*, Macmillan, Collier-Macmillan, London.
- Kemps, A., and Timmermans, P. (1982). Parturition behavior in pluriparous Java-macaques (*Macaca fascicularis*). *Primates* 23: 75-88.
- Love, J. A. (1978). A note on the birth of a baboon (*Papio anubis*). *Folia primatol.* 29: 303-306.
- Nash, L. T. (1974). Parturition in a feral baboon (*Papio anubis*). *Primates* 15: 279-285.
- Oppenheimer, J. R. (1976). *Presbytis entellus*: Birth in a free-ranging primate troop. *Primates* 17: 541-542.
- Sekulic, R. (1982). Birth in a free-ranging howler monkey *Alouatta seniculus*. *Primates* 23: 580-582.
- Sokal, R. R., and Rohlf, F. J. (1981). *Biometry*, 2nd ed., W. H. Freeman, San Francisco.

- Stewart, K. J. (1977). The birth of a wild mountain gorilla (*Gorilla gorilla beringei*). *Primates* 18: 965-976.
- Wooldridge, F. L. (1971). *Colobus guereza*: Birth and infant development in captivity. *Anim. Behav.* 19: 481-485.