

BRIEF REPORT

Observation of Parturition in the Mexican Mantled Howler Monkeys (*Alouatta palliata*) on the Island of Agaltepec, Veracruz State, Mexico

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We observed a birth in a group of Mexican mantled howler monkeys (*Alouatta palliata*) living under semi-free-ranging conditions on Agaltepec Island, Catemaco, Veracruz, Mexico. Although we could not quantify contractions, we were able to record a complete description of the sequence of events that resulted in a successful birth. Nine minutes passed from the release of the amniotic fluid to the total emergence of the infant. Although all group members were resting relatively close to the female when the birth occurred, none approached her until the postpartum period. Only then did several individuals briefly inspect the newborn and then resume their foraging activities. *Am. J. Primatol.* 65:93–98, 2005. © 2005 Wiley-Liss, Inc.

Key words: *Alouatta palliata*; Mexican mantled howler monkey; parturition behavior; Agaltepec Island, Mexico

INTRODUCTION

The behaviors of free-ranging primates before, during, and immediately after parturition are still poorly known. This fact may be related to two major observational obstacles: in primates there is a tendency toward nocturnal births [Jolly, 1972, 1973], and in the case of arboreal primates, it is difficult to get near enough to the animals to closely observe a birth taking place.

In this paper we report the observation of a birth in Mexican mantled howler monkeys (*Alouatta palliata*) living under semi-free-ranging conditions. We present a description of the different parturition phases and the behaviors of other group members.

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MATERIALS AND METHODS

Study Site

The birth was observed during a long-term study concerning social relationships between males on Agaltepec Island (18°24'–18°25'N and 95°05'–95°06'W), a semi-evergreen rain forest located in the Los Tuxtlas region, Veracruz, Mexico. A more complete description of this site can be found elsewhere [Rodríguez-Luna et al., 2003]. The Universidad Veracruzana translocated an initial group of 10 individuals (two males and eight females) to this island (8.3 ha) in 1988, and at the time of this observation (January 1999) the group consisted of 59 individuals (13 males, 21 females, 10 subadults, nine juveniles, and six infants). The group had fission-fusion social organization, which emerged as a response to population increase (Dias and Rodríguez-Luna, unpublished results). Over the last 16 years, demographic [e.g., Carrera-Sánchez et al., 2002], behavioral [e.g., Dias, 2002], and ecological [e.g., Rodríguez-Luna et al., 2003] studies have been conducted on this howler monkey population.

The female that gave birth (Niña) was approximately 14 years old, and was one of the females that were translocated to this site. Before they were released, all individuals were measured, weighed, marked, and evaluated for general health, and their age was estimated according to dental wear [Rodríguez-Luna & Cortés-Ortiz, 1995]. This was Niña's sixth pregnancy, and she died in March 2004 at the age of 19 years. She had nine infants, seven of which were males that still live in this group. The sex of the other two infants is unknown (both died before 1 year of age). Her interbirth interval averaged 19.6 months (E. Rodríguez-Luna, unpublished data).

We began ad libitum observations when we fortuitously realized that this female was in labor (our attention was drawn by her repetitive walking back and forth), and we watched her throughout the rest of the day. During our observations we used 10 × 42 Nikon binoculars (the female was approximately 20 m away during the whole sequence). In addition, we used a tape recorder to register the female's behavior during this episode, and a stopwatch to record the timing of the events to the nearest minute.

RESULTS

The birth took place on 6 January 1999, during the afternoon. The first contact with the female was at 1400 hr. By then she was already in labor, so the total duration of that stage is unknown.

During labor, birth, and the postpartum period (Table I), the female stayed on a branch (*Gliricidia sepium*; approximately 5 m long) that was 15 m above the ground. The entire sequence of events was observed without obstructing vegetation. The female was quite isolated, and the nearest neighbor (another female) was in a different tree at a distance of 15 m. All group members were resting in other trees, and they remained so during the entire birth process. No attention was paid to the female; no vocalizations were made by other group members, and no approach attempts occurred.

When the observations began (1400 hr) the female was quite restless, and walked back and forth repeatedly. She made short pauses during which she bent over in a squatting posture and placed one of her hands in the pubic area, which she would then inspect by smelling and/or licking it. Throughout this phase, the female produced short vocalizations of weak intensity and sharp tone. This period corresponds to a final parturition phase when contractions increase in frequency,

TABLE I. Phases of the Birth, and Description of Behavioral Events and Their Hour of Occurrence (Duration Also Indicated)

Phase (total time)	Hour	Behavioral observations	Duration (min)
Pre-Partum (5 min. observed)	1400	The beginning of this phase is unknown; Female is restless and inspects the pubic area	?
	1405	Releasing of the amniotic fluid	< 1 min.
Delivery (11 min.)	1408	First emergence of the infant	–
	1414	Total emergence of the infant	6 min.
Post-Parturition (45 min.)	1416	The female chews the umbilical cord	≤ 1 min.
	1419	Expulsion of the placenta	5 min.
	1429	Consumption of the placenta	10 min.
	1445	The group begins to travel and some individuals approach the female and inspect the infant	35 min.
	1515	The infant suckles for the first time	(all activities)
	1520	The female forages with the rest of the group	

indicating the immediacy of birth [Nisbett & Glander, 1996]. These behaviors lasted for about 5 min. At 1405 hr the female became still, in a squatting position, and approximately 100–150 ml of clear fluid, presumed to be the amniotic fluid, was released from the vagina. Delivery began immediately, and 3 min later (1408 hr) the infant's head vertex began to emerge (in vertex occiput posterior position). During this phase the female helped the expulsion of the infant by gently pulling it with her right hand, and sometimes with both hands. Approximately 6 min passed (1414 hr) from the time of the initial emergence until the infant's total emergence. Once freed, the newborn clung to the abdominal area of the progenitor, which then immediately began to lick the newborn. The infant presented a dark gray coloration, and did not produce any audible vocalizations.

Two minutes after the birth (1416 hr) the progenitor began to chew the umbilical cord until it was cut, a process that did not last more than 1 min. About 5 min after the birth (1419 hr), the placenta was expelled with help from the female, who had been pulling on it since the baby's birth. The placenta was then consumed in approximately 10 min (1429 hr). The infant remained holding on to the mother's chest and was not observed trying to suckle. After the delivery was completed, we searched for vestiges of the placenta that might have fallen to the ground, but found nothing, which suggests that it was entirely consumed.

Forty-five minutes after the first observation of the female's parturition phases, the group began to travel (1445 hr). Some individuals (two males, two females, and one juvenile) approached the mother and inspected the newborn. These individuals usually watched and smelled the infant for varying periods of time, but no attempts to touch the infant were observed. The group, including the mother and infant, traveled to an area (at approximately 340 m) where they usually feed during the afternoon during this time of the year. About 1 hr after birth (1515 hr) the infant was seen suckling for the first time, and at 1520 hr the female was observed feeding with the rest of

the group members. No other interactions between other individuals and the recent mother and her infant were observed up to the time our observations ended at 1730 hr.

The female and the infant were observed on subsequent days with other group members. This infant developed normally and is presently a healthy 5-year-old young adult male.

DISCUSSION

Three main parturition phases can be identified from the observation of this event. The first, prepartum phase is not described completely due to the fact that labor had already begun, as indicated by the female's restless behavior and repetitive inspections of the pubic area. We did not directly observe contractions; however, it is possible that they are quite subtle, since in other birth descriptions for *A. palliata* [Moreno et al., 1991] and *A. seniculus* [Sekulic, 1982], the authors did not make reference to direct observation of contractions. Contractions have been observed in only one report to date [Nisbett & Glander, 1996].

The second phase is the delivery. This includes the entire sequence, which begins with the emergence of the infant and finishes with its total expulsion. The duration of this phase (6 min) was longer than that observed by Sekulic [1982] in two births in *A. seniculus*, during which the delivery phases lasted 1 and 2 min, respectively. However, the delivery phase we observed was similar to those observed by Moreno et al. [1991] in *A. palliata* (a breech delivery by a multiparous female that lasted approximately 5 min) and by Nisbett and Glander [1996] (a head-first delivery by a primiparous *A. palliata* female that lasted 6.5 min). Breech deliveries are usually associated with prolonged labor in primates [Rushton & McGrew, 1980], and this could account for the longer duration of the birth reported by Moreno et al. [1991]. On the other hand, in some primate species (e.g., common marmosets (*Callithrix jacchus*) [Poole & Evans, 1982]), primiparous females have been reported to experience birth complications, which may even lead to neonatal death. Primiparity could explain the relatively long duration of the birth observed by Nisbett and Glander [1996]. However, from the similarity in delivery duration between our observation of a multiparous female and that by Nisbett and Glander [1996] of a primiparous female, we suggest that *A. palliata* females may experience longer deliveries compared to *A. seniculus* females, independently of parity status.

The last phase is postparturition, which begins with the progenitor's first maternal care (she licks the infant), continues with the cutting of the umbilical cord, and terminates with the ingestion of the placenta. In contrast to the description by Moreno et al. [1991], but similar to the one by Nisbett and Glander [1996], in our observed birth, several individuals approached the female and inspected the newborn during the postpartum phase. Even though the placenta was totally consumed in our study, we observed the female feeding less than 1 hr after the birth, whereas in Moreno et al.'s [1991] report, the female did not feed for the rest of the day.

As for the consequences of giving birth and being born in such a large group, the nonadaptive hypothesis for infanticide in primates suggests that this behavior may emerge as a result of overcrowding and stress associated with anthropogenic habitat disturbance [Bogges, 1979; Curtin & Dolhinow, 1978]. However, infanticide in howler monkeys is arguably best explained by the sexual selection hypothesis [e.g., Clarke, 1983; Crockett & Janson, 2000]. During more

than 16 years of continuous observations in this population, no infanticide and infanticide attempts have been observed (E. Rodríguez-Luna, personal communication). Until further data become available on the behavioral strategies that these howler monkeys use to cope with their unusual demographic and ecological conditions (i.e., large group size, small home range, and high population density), interpretations about the absence of infanticide will be limited.

Finally, Sekulic [1982] suggested that howler monkeys may be less constrained by selection against giving birth during the day, as a result of their energetically conservative feeding ecology, which allows recent mothers to keep up with group activities. We suggest that in our case the absence of predators on this island may represent an additional factor favoring daytime births. Of the identified potential predators for *Alouatta* [reviewed in Asensio & Gómez-Marín, 2002], only ocelots (*Felis pardalis*), tayras (*Eira barbara*), and boas (*Boa constrictor*) are present in this region (Los Tuxtlas), but none of these species inhabit this small island (E. Rodríguez-Luna, unpublished data).

Even though several demographic, ecological, and social characteristics of this group diverge considerably from those reported for mantled howler monkeys at other sites (e.g., population density, home range, and fission-fusion social organization), there is no evidence from the present observation that these factors influence birth-related behaviors. The duration of the parturition phases, the behaviors of the mother and the newborn, and the behavior of the other group members resemble those observed by Nisbett and Glander [1996] under more "typical" socioecological conditions. Therefore, we consider that this is a representative observation for *A. palliata* births.

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