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BIRTH IN BONOBOS (*PAN PANISCUS*): A CASE REPORT

Abstract - Birth in non-human primates has been described in several species but there is an almost total lack of data about the reactions of other group members towards the mother and the newborn. This report describes a delivery by a member (hereafter «the mother») of a captive group of bonobos (*Pan paniscus*) hosted at Apenheul Primate Park (The Netherlands). Three observers followed the group: one of them collected data on the mother, named Kumbuka, via focal animal sampling, the second registered the identities and behaviours of group members that were in proximity of the mother, and the last one video-recorded the delivery. The mother performed the characteristic squatting posture during contractions, touched her vaginal area and moved her hands from her vagina to her mouth and licked her fingers. Four females (two adult, one juvenile, and one infant) were extremely interested in the mother: they followed and frequently touched her. Males and the other pregnant female never approached the mother before birth took place. We also observed the consumption of the placenta, which was shared among group members. Although the other pregnant female was one of the most important females in the group, she was never seen in proximity of the mother and she neither asked for the placenta nor received it.

Key words - Delivery, primiparous female, group behaviour, placenta sharing, human comparison.

Riassunto - *Nascita e socialità: descrizione di un parto tra i bonobo.* Come nell'uomo, anche nei primati non umani il parto rappresenta un momento molto delicato perché segna l'inizio della complessa relazione madre-piccolo e l'ingresso di un nuovo membro nel gruppo. Il parto può essere considerato a tutti gli effetti un «evento sociale» ma le descrizioni dei comportamenti dei membri del gruppo durante questo avvenimento sono molto rare.

Il comprendere le dinamiche sociali che si instaurano al momento del parto può fornire preziose informazioni sulle relazioni che intercorrono tra i vari membri del gruppo e mettere, inoltre, in luce i processi che stanno alla base delle cure alloparentali.

In questo lavoro viene descritto un parto diurno in una colonia di bonobo (*Pan paniscus*) ospitata presso l'Apenheul Primate Park (Apeldoorn, Paesi Bassi). Tre osservatori hanno seguito il gruppo; l'ambiente di cattività ha permesso l'osservazione e la videoripresa del parto. È stato così possibile descrivere nel dettaglio i comportamenti della madre durante il travaglio e le sue prime reazioni nei confronti del neonato. Inoltre, dal momento che la partoriente Kumbuka è rimasta nel gruppo per l'intera durata dell'evento, sono stati osservati i suoi comportamenti anche verso gli altri membri della colonia e viceversa. Gli individui più interessati erano quattro femmine, due adulte e due giovani, che hanno seguito la madre per tutta

la durata del travaglio. Immediatamente dopo l'espulsione, la placenta è stata ingerita dalla madre, che l'ha successivamente condivisa con le femmine adulte che l'avevano seguita durante il parto.

Parole chiave - Parto, femmina primipara, comportamenti membri gruppo, condivisione placenta, confronto con l'uomo.

INTRODUCTION

As in humans, birth in non-human primates is an essential and critical moment because it represents the starting point of the mother-infant relationship within the social community (Ferrari *et al.*, 2009). Delivery is quite rare to observe because it is difficult to predict the exact timing of parturition (Turner *et al.*, 2010) and because most of the diurnal primates tend to give birth during the night in order to limit predation (Jolly, 1972) and to reduce the stress of the mother (Timmermans & Vossen, 1996; Thomsen, 1997). Even if the delivery process has been described in several primate species, most of the authors focused only on the qualitative description of the mother periparturitional behaviour and on the first reactions of the baby (Brandt & Mitchell, 1971 for a review). Given that these reports deal with highly social species, it is surprising that only few authors have described the group responses to the parturition, both in captivity (Gouzoules, 1974; Nadler, 1974; Negayama *et al.*, 1986) or in the wild (Nash, 1974; Ratnayeke & Dittus, 1989; Stewart, 1977; Chism *et al.*, 1983). During labour, captive females are usually separated from the group to let the observer describe in detail the delivery phases (Timmermans & Vossen, 1996). On the other hand in the wild, where such observations could be potentially performed, the mother-to-be tends to isolate and hide herself (Ratnayeke & Dittus, 1989), thus making impossible for the observer to follow the episode. The few descriptions of group reactions to parturition involve monkeys (Ratnayeke & Dittus, 1989; Stewart, 1977; Gouzoules, 1974; Chism *et al.*, 1983) and, among anthropoids, gorillas (Nadler, 1974; Stewart, 1977). Even if often neglected, the strong influence of group members since the first phase of life has been already emphasized by Hinde & Spencer-Booth (1967), who demonstrated that, in the absence of group companions, mothers and infants spent less time in physical

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contact. Moreover, Berman (1982) showed that from the moment of birth the newborn is introduced in a specific social network which corresponds to that of the mother. The newborn then moves through an ontogeny process of early social relationships that resembles a process of differentiation. It is therefore clear that it is important to follow the behaviour of the entire group especially during the critical moment of parturition. This seems even more important in bonobos, a species phylogenetically and behaviourally close to humans, in which alloparental care is often at the basis of the social harmony of the group (Kano, 1982).

Despite the significance of the delivery as a «social event», no *Pan paniscus* births have ever been observed in the wild and the three accounts of deliveries reported in captivity deal only with socially isolated mothers (Kirchshofer, 1962; Hill, 1968; Bolser & Savage-Rumbaugh, 1989).

We observed a daytime birth in a captive group of bonobos (*Pan paniscus*) hosted at the Apenheul Primate Park (The Netherlands). The optimal visibility, made possible by the captive environment, allowed us to video-record the entire event. As the mother was free to move in the enclosure we could also observe the responses of the other group members. During delivery, the mother remained in her social group so we could describe her reactions towards the other members and *vice versa*.

METHODS

The observations were made on August 7th, 2009, during a 3-month study on social behaviour carried out by the authors between August and October at the Apenheul Primate Park (The Netherlands). Parturition took place in the afternoon when the Park was open to visitors and started at about 4.00 PM. The bonobo enclosure included a huge indoor room (230 square meters) and an outdoor naturalistic island (5,000 square meters), in which the animals could freely move. The colony was composed by ten individuals: seven adults, one juvenile and two infants (Tab. 1).

Three observers followed the group: one of them collected data on the mother-to-be Kumbuka via focal-animal sampling (Altmann, 1974) by using a voice-recorder, the second registered the identities and reactions of group members, especially of those that interacted with the mother and the new-born, and the third video-recorded the entire event. The data collected via the different approaches were then integrated and compared in order to describe the event as accurately as possible. The observations of the delivery covered all the 4 phases reported in earlier works on other primates: *prepartus phase* (the total period of labour, except the last five minutes before birth), *prepartus* (the last five minutes before birth), *partus* (delivery of the infant) and *postpartus* (the period following the birth up to the separation of the placenta from the infant) (Brandt & Mitchell, 1973; Kemps & Timmermans, 1982).

RESULTS

At 15.56 while we were conducting behavioural observations, we noticed that Kumbuka was walking around the indoor enclosure in a very restless manner continuously followed by Jill, Liboso, Lingala, and Nayembi. We focused our attention on these subjects trying to discover the reason for this widespread anxiety. Kumbuka had an external vaginal dilatation of about 5 centimetres of diameter and the top of the infant's head was visible (crowning) (Fig. 1). We immediately started describing and video-recording the event. The mother continued walking and frequently stopped. She performed the characteristic squatting posture, touched her vaginal area and moved her hands from her vagina to her mouth and licked her fingers. The females Jill, Liboso, Lingala, and Nayembi continued to follow Kumbuka and only stopped to lick the birth fluids on the floor. The followers also inspected Kumbuka's vaginal area by hands and mouth. At 16.04 the infant's head and shoulders emerged while Kumbuka was still walking. She held the baby's head with her left hand and continued walking (Fig. 2). The group emitted soft-barks vocalizations.

Tab. 1 - Details of the ten bonobos hosted at the Apenheul Primate Park (The Netherlands) at the time of Kumbuka's delivery in August 2009.

Name	Code	Kinship	Sex	Age Class	Rank	Age
Jill	J	Lingala's mother	F	Adult	High	24
Lingala	Ln	Jill's daughter	F	Juvenile	Medium	6
Zuani	Z	Liboso's mother, Nayembi's grandmother	F	Adult	High	19
Liboso	Li	Zuani's daughter, Nayembi's mother	F	Adult	Medium	11
Nayembi	N	Liboso's daughter, Zuani's granddaughter	F	Infant	Low	3
Hortense	H	Zamba's and Hongo's mother	F	Adult	Low	30
Zamba	Za	Hortense's son, Hongo's brother	M	Adult	Low	11
Hongo	Ho	Hortense's son, Zamba's brother	M	Infant	Low	3
Mobikisi	Ma	-	M	Adult	Low	29
Kumbuka	K	-	F	Adult	Medium	10



Fig. 1 - Beginning of the observations. Kumbuka's vaginal dilatation (about 5 cm) and the crowning are visible. In the background Jill, Liboso, Nayembi and Lingala are seen licking the birth fluids on the floor.



Fig. 2 - Baby's head and shoulders emerged. Kumbuka holds the baby's head with the left hand while walking.

At 16.05 the baby was born in the *occiput posterior* position (with the back of the head against the mother's sacrum). The newborn was completely covered in a thick, greenish mucus and its mother was holding it by hands while walking bipedally (Fig. 3), always followed by the same females.

At 16.08 the placenta was birthed and the mother immediately began eating it while walking. She laid down only to bite the umbilical cord. The followers became now extremely interested in the placenta and pressed the mother by performing all those behaviours usually linked to the feeding context, such as peering, begging with hand and reaching out hands. The adult female Hortense tried to approach Kumbuka only once but she was immediately chased away by subadult female Lingala.

At 16.11 the baby was clinging to her mother and its eyes were open.

At 16.14 Jill, the alpha female, was the first to receive Kumbuka's placenta, the next was Liboso that shared it with her daughter Nayembi. Lingala did not directly receive the placenta from Kumbuka but obtained a little part of it from her mother, Jill. After sharing the placenta, the followers spent much less time with the mother and the newborn (Fig. 4). The mother laid down and started licking the baby and cleaning herself from the birth fluids. At this point the situation became relaxed and for the first time at 16.28 Mobikisi, the oldest male of the colony, approached the mother and the baby and remained in their proximity.

At 16.30 Kumbuka isolated herself by chasing away Mobikisi. The other males Zamba and Hongo and the

pregnant female Zuani never approached Kumbuka. Figure 5 reports the amount of time each individual of the colony spent in proximity of the mother during the entire event.

We terminated our observation at 16.50.

DISCUSSION

Since we started describing the event from the last minutes of the *prepartus phase*, our observations cover all the 4 delivery phases described in previous works (Brandt & Mitchell, 1973; Kemps & Timmermans, 1982). Due to the difficulty to detect any particular change in the mother's behaviour or any other kind of evident sign of imminent delivery (Timmermans & Vossen, 1996; Gouzoules, 1974), we could not describe the *prepartus phase* from its beginning. Actually, restlessness is considered one of the key criteria for predicting a delivery (Brandt & Mitchell 1973; Adachi *et al.*, 1982; Goodlin & Sackett, 1983; Ratnayeke & Dittus, 1989).

During labour, Kumbuka was very restless and looked confused and awkward. These features have been reported in literature and have been attributed to primiparous females (Tinklepaugh & Hartman, 1931; Coe, 1990; Timmermans & Vossen, 1996; Nadler, 1974). Although Kumbuka was actually a primiparous female we could not exclude that her restlessness, confusion and awkwardness could also be a response to the pressing of the females that continuously followed her. Since the adult females already experienced delivery, it is probable that they were attracted by the birth fluids, and later by



Fig. 3 - Immediately after birth Kumbuka walks bipedally holding the newborn with her hands. Behind Kumbuka the followers Jill, Liboso, Nayembi and Lingala can be seen.

the placenta, for alimentary or physiological reasons (Kristal 1980; Timmermans & Vossen, 1996; Tinklepaugh & Hartman, 1931). Perhaps the juvenile and the infant females were mostly driven by curiosity, which is extremely strong in young apes (Stewart, 1977).

Kumbuka continued walking around the indoor enclosure and stopped only to take the characteristic squatting posture, typically associated to the moment of the contractions (Nakamichi *et al.*, 1992). She continuously inspected her vaginal area by hands and then licked her fingers. This could be an adaptive behaviour that prepares the mother to recognize the baby as hers before its birth and to solicit the first maternal responses towards the newly born (Nadler, 1974).

The baby was born in the *occiput posterior* position, the typical birth position in human and non-human primates (Trevathan, 1988). As it occurs in other primate species (Timmermans & Vossen, 1996; Ratnayeke & Dittus 1989), the mother held the baby's head with her hand, until the complete emergence.

According to Trevathan (1988) larger primates, with the exception of humans, encounter fewer difficulties during delivery than do smaller primates because the cranial dimensions of the infants are far below those of the maternal pelvis. This was confirmed by our observations: the delivery of the infant was very quick and

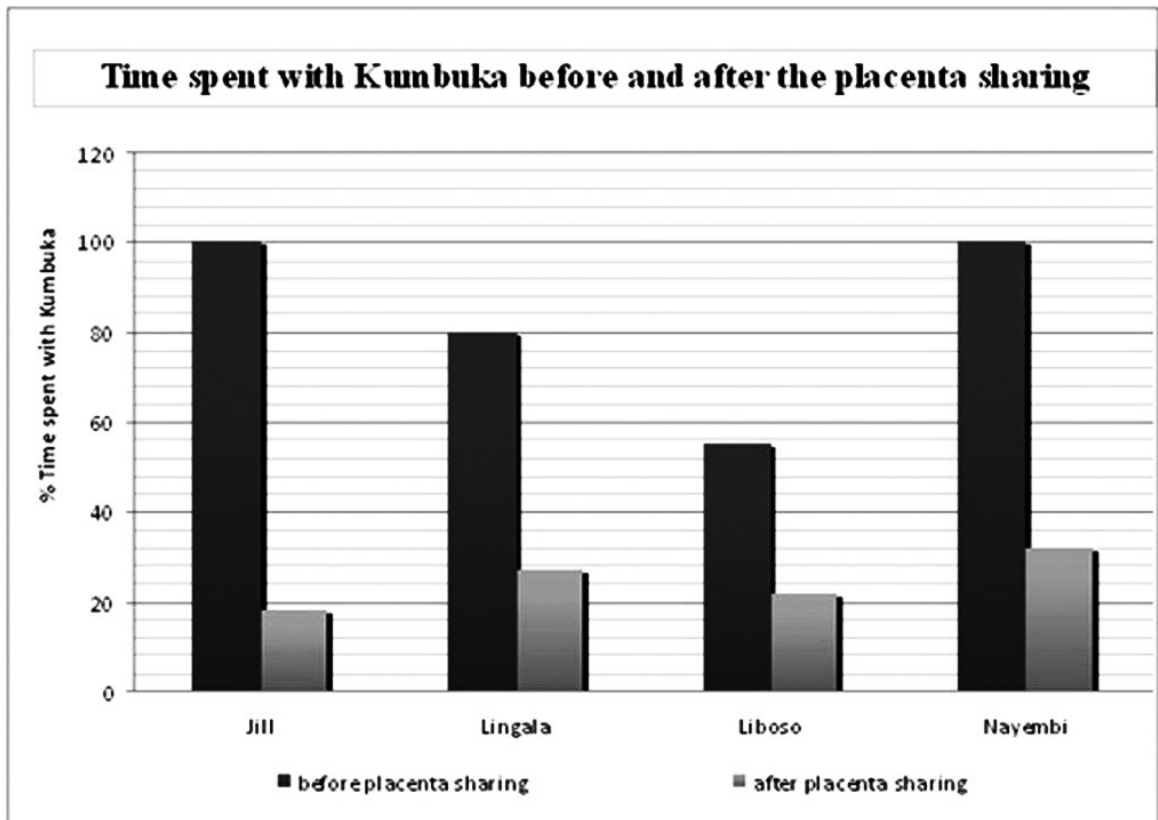


Fig. 4 - Percentage of time spent by the followers in proximity of Kumbuka before and after the placenta sharing.

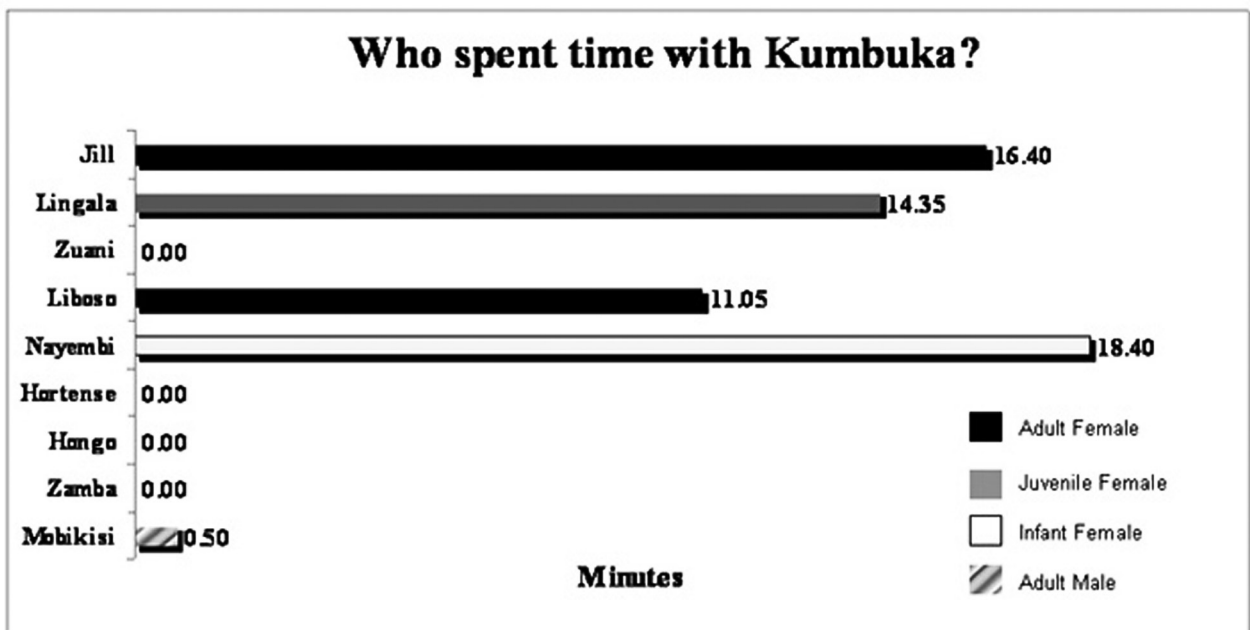


Fig. 5 - Minutes spent in proximity of Kumbuka by each member of the colony during the whole event.

appeared not to be very hard or painful to the mother. Kumbuka began consuming the placenta immediately after its delivery. Even if placentophagia has been reported in non-human primates (Brandt & Mitchell, 1971) it is not so common among apes (Goodall, 1967; Brandt & Mitchell, 1971) and it still remains a controversial issue. Many hypotheses have been formulated to explain this «behavioural enigma», although it is highly probable that different factors occur at the same time (Kristal, 1980; Kristal *et al.*, 2011). As we already hypothesized for the birth fluids, it is probable that the adult females whom had already experienced delivery might have been attracted by the afterbirth for opportunistic alimentary or physiological reasons. Kumbuka let only two females eat the placenta from her hands: Jill, the alpha female, and Liboso, a medium ranking individual, and both of them then shared it with their respective daughters, Lingala and Nayembi. The fact that placentophagia might be driven not only by an alimentary reason but also by some physiological and hormonal motivations (Kristal, 1980) is supported by our observations. Indeed, the only adult female that did not approach, nor even tried to, was at the very end of her own pregnancy: she gave birth at night, four days after Kumbuka. It could be that pregnant females feel a sort of repulsion for the birth fluids and the afterbirth for hormonal reasons (Tinklepaugh & Hartman, 1931). After the sharing of the placenta the followers went away and let Kumbuka alone with her baby, so it seems probable that they were not attracted by the birth itself but rather by some kind of alimentary opportunistic drive.

All the males of the colony seemed not particularly interested in the birth and kept their distance during the

entire event. This could be due to the fact that in bonobos males are subordinate to females, so it is probable that they did not approach the mother and her followers in order to avoid any possible aggression. The oldest male of the colony, Mobikisi, approached Kumbuka only when the followers went away after the sharing of the afterbirth and so the situation became calmer. Nevertheless, he remained in her proximity only for two minutes because Kumbuka chased him away to stay alone with her baby. Differently from that reported for other primate species (Gouzoules, 1974), bonobo males did not show sexual arousal during the delivery. Kumbuka immediately took care of her baby. When she remained alone she laid down on her back and licked and polish herself and the new-born for a long time. Licking is thus the first extensive contact between the mother and the infant (Ewer, 1968) and maybe driven by the mother's affinity for the birth fluids that cover the infant (Stewart, 1977).

Some days after the delivery, the bonobo keepers informed us that the newborn was a healthy female and they gave her the name of Yahimba, that in the Congolese Lingala language means «home sweet home».

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