

BIRTH MANAGEMENT OF A PAIR OF WHITE-CHEEKED GIBBONS AT BROOKFIELD ZOO

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Currently, Brookfield Zoo is home to three white-cheeked gibbons (*Hylobates concolor leucogenys*). Indah, a nulliparous adult female (born November 18, 1988) and Benny, an adult male (born June 7, 1985) arrived at Brookfield Zoo in 1995. The animals were paired at the recommendation of the Gibbon Species Survival Plan. The gibbons are exhibited in the Asia section of Tropic World, the zoo's primate facility. The animals typically spend about 8 hours a day on public exhibit and return to their holding enclosures in the evening.

Subsequent to their 1995 introduction, keeper staff observed the animals copulating regularly. On December 9, 1996, Indah gave birth to a full-term stillborn infant. Based on copulation dates, gestation was estimated to be approximately 210 days. Indah resumed menstruating on March 3, 1997, 84 days post-partum. After this time, the pair were observed to copulate regularly. On August 8, 1997, Indah was seen eating a large quantity of solid, bloody tissue. Staff assumed this was a mid-term miscarriage. Pathology reports confirmed that the tissue was placental. On September 5, 1997, menstruation resumed and the pair resumed regular copulatory behavior. During this time, Indah exhibited regular vaginal bleeding associated with menses. In May of 1998, menses occurred on the 13th through the 15th. The pair was observed copulating on May 23, 1998 (8 days post menses). No further evidence of menstruation was seen after this date. Nineteen menstrual cycles were recorded between September 21, 1995 and May 15, 1998. (See Figure 1) The cycle length ranged from 16 to 37 days with an average of 23.8 days.

On December 16, 1998, Indah gave birth to a male offspring, named Melouprey. Based on fetal age estimate during ultrasound and copulation dates, the gestation was 207 days long.

PRE-PARTUM PREPARATIONS

Keeper staff met regularly to prepare for the upcoming birth. The Gibbon Species Coordinator was contacted for a recommendation on the need to hand-rear the infant if necessary. Since the parents were of genetic value to the SSP population, the infant would be hand-reared if necessary. Preparations included:

- Formal data collection through behavioral observations were begun by the zoo's Behavioral Husbandry and Research Program. Observations focused on changes in Indah's behavior during pregnancy and the onset of labor. Behaviors recorded included stretching, crouching, and straining. Interactions between Indah and Benny were also recorded to determine if there was any noticeable changes in affiliative behavior.
- The animals were routinely brought off exhibit mid-afternoon and returned to their holding enclosures. This allowed keeper staff to observe the animals more closely and helped acclimate the gibbons to spending more time in their holding area. Immediately post-partum, the animals would remain in their holding enclosures until proper mother/infant health and behavior was

confirmed. The increased time in holding did not appear to be of a stressful nature.

- The holding enclosures were bedded heavily with a deep layer of wood shavings. A deep layer of bedding would ensure the safety of the infant if Indah gave birth on the floor or it did not cling properly.
- A plan was implemented to monitor the animals once labor was confirmed or the birth occurred. This included a 24-hour continual watch by staff.
- Criteria were developed to evaluate proper maternal behavior and the physical health of the infant. The guidelines included the monitoring the infant's ability to nurse and cling properly, observation of proper maternal behavior, and overall physical condition of infant and mother.
- Equipment necessary to hand-rear the infant was readied. This included an incubator, thermometer, bottles, nipples, and blankets. A nutrition plan detailing formula type, amounts and feeding schedule was prepared by Zoo Nutrition Services.
- Enlistment of volunteers to provide round-the-clock care to carry and feed the infant if necessary.
- A plan was developed for early re-introduction to Indah if the infant was to be hand-reared. This plan was developed by the Primate Department Staff, Zoo Nutrition Services and Veterinary Services.

Pre-Partum and Birth Observations

On the morning of December 16, 1998, keeper staff observed Indah having a possible contraction. No other contractions were observed following this. Due to the closeness of the anticipated birth, the pair remained in their off-exhibit holding enclosures for closer observation. At 15:38, when Indah began to have obvious contractions, Benny was moved to an adjacent cage. The following chart shows the progression of Indah's labor:

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|--------|---|
| 15:44: | passing clear colored vaginal fluids and/or urine. For the next 33 minutes the length of the contractions ranged from 1 to 5 minutes. |
| 16:17: | while in a standing position, begins to bend at the waist while touching her hands and feet to the ground making a complete arch of her body. |
| 16:36: | begins to vocalize while in this same posture. |
| 16:50: | passes thick blood-tinged fluid during a contraction. |
| 17:12: | for the next 48 minutes, the contractions become more regular in length and take place about 2 minutes apart |
| 18:00: | contractions occur about 1 minute apart |
| 18:08: | begins to bear down hard during contractions, passes large amounts of vaginal fluids. |

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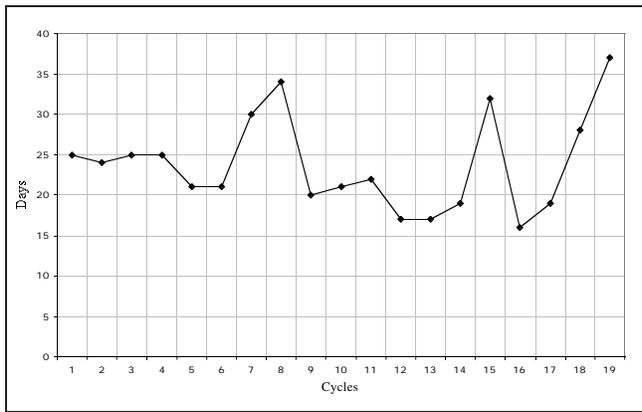


Figure 1. Indah cycle lengths.

Table 1
Behavioral Enrichment Program

Day	8 a.m. Forage Pile	10:30 a.m. Ice Treats/ Lixits	1:00 p.m. Whole Foods	3:30 p.m. Forage Balls
1	Raisins	Kool-aid	Apple	Peanuts
2	Grapes	Dilute O.J.	Green pepper	Chopped apple
3	Peanuts	Dilute peach nectar	Eggs	Raisins
4	Popcorn	Dilute O.J.	Bread	Honey
5	Blueberries	Kool-aid	Carrot	Jello

- 18:20: infant's head crown visible
- 18:24: male infant Melouprey is born and immediately begins to vocalize
- 18:25: placenta passed

POST-PARTUM MANAGEMENT

Due to the size of the Tropic World: Asia exhibit (400,000 cubic feet) and the height of the exhibit trees (40 to 50 feet), the group was kept in their holding area for post-partum observations. As planned, a 24-hour continual watch by keeper staff was begun to monitor Indah's condition and to confirm the infant was strong and nursing. The infant was observed rooting on Indah's nipples four hours post-partum but confirmed nursing did not take place until the infant was 9 hours old. After this nursing bout, the infant was seen to nurse regularly. On December 24, Benny was reunited with Indah and Melouprey without incident. Over the next 15 days, keeper staff observed normal mother/infant behavior. Benny was observed pressing his chest against the female and infant. His behavior appeared to be a solicitation to carry Melouprey.

On January 10, 1999, 25 days post-partum, keepers observed Indah holding the infants arm away from her body on one occasion during normal locomotion. The following day, the group was let out onto the exhibit for the first time since the birth. Initially, the animals locomoted and foraged in their normal patterns. After being on exhibit for 30 minutes, keeper staff observed Indah pulling the

clinging infant from her body, wrenching his arms and legs in a forceful manner. During this interaction, she bit aggressively at Melouprey. The group was immediately returned to their holding area. Later that same day, Indah was observed to repeatedly pull Melouprey's limbs and entire body off of her abdominal area.

On January 12, 1999, during a routine animal wellness check, keepers noticed a few scabs on Melouprey's head. From 08:30 to 10:00, Indah repeatedly removed one or more of his limbs from her body. This behavior occurred at least once a minute and up to three times a minute.

A staff meeting was held to develop an action plan to address this unusual behavior. The outcomes included:

- *Increasing the number of feedings throughout the day to increase activity and create distraction from the limb pulling behavior.* Feedings of the group were initially increased from two per day to four per day. Nine days later they were increased to 6 per day.
- *A 24-hour surveillance of the animals including overnight surveillance via 2 low-light video cameras.* Video surveillance of the animals in their holding enclosures proved to be difficult to review. This was due to the mesh on the enclosure front and the distance of the animals from the camera. Fine details of behavior were difficult to discern.
- *Medication of Indah with Diazepam™ to determine if it would help reduce the abnormal behavior of arm pulling.* Dizaepam™ was offered for 1.5 days. During this period of time, no apparent affect on her behavior towards the infant was noticed so the drug was discontinued. Busparone™, an anti-anxiety drug, was then prescribed. The initial dose offered was 1.5mg twice a day. Over the next few days, Indah's abnormal behavior continued and the infant was observed to sleep more than usual. On January 17, 1999, the Busparone™ dose was increased to 2.5mg twice a day. Again no noticeable change was observed in Indah's behavior towards the infant. The amount of Busparone™ was again increased on January 22, 1999 to 5.0mg twice a day. The Busparone™ treatment was continued for 22.5 days during which time it had no apparent affect on her aberrant behavior towards the infant.
- *An expanded behavioral enrichment program.* An expanded behavior enrichment program was begun, which included presenting diet items in novel ways that would extend foraging time and promote psychological well-being (Table 1).
- *Contact zoological parks and primate and gibbon behavior experts for advice.* Behavior similar to what we had observed had not been observed by anyone we had contacted. The arm removal behavior continued. Staff also began to observe Indah removing the infant's legs from her body. At times she would extend (pull) his limbs further away from her body once she removed them. Occasionally, this would cause the infant to vocalize and sometimes would escalate into a distress call. Observations were done from January 18, 1999 to March 10, 1999 (Figure 2).

Melouprey continued to grow and develop psychologically despite the unusual behavior that we were observing between Indah and Melouprey. He appeared strong and clung to Indah normally. Staff decided to allow the animals exhibit access and to try to establish the group to their normal daily routine.

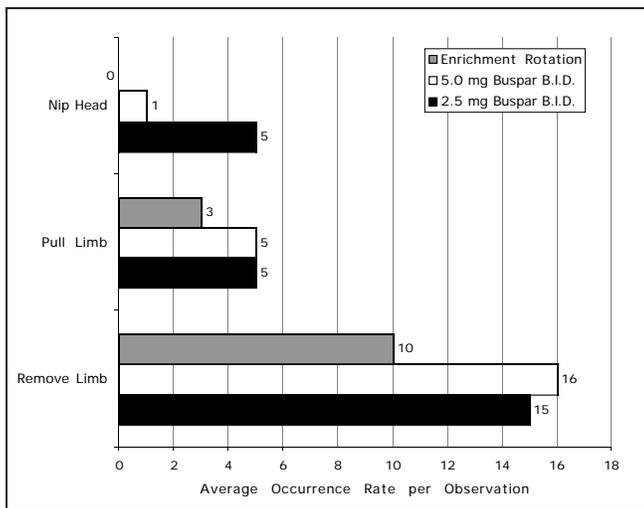


Figure 2. Post-partum behavior toward Melouprey.

Preparations for returning the group to the exhibit included:

- Placing plastic crates high in the trees to provide safe, additional resting places for Indah and Melouprey. Similar crates are located in the gibbons' holding enclosures and Indah and Melouprey frequently sit in them.
- Development of graphics for the walkway. One graphic addressed the milk crates and substrate on the exhibit floor. Another graphic discussed the behavior that zoo guests might observe between Indah and Melouprey.
- Meetings with volunteers and docents regarding our preparations and discussion on how to answer potential questions re-

garding the gibbons' behavior. They were also briefed about the significance of the birth to the SSP and Brookfield Zoo.

- Assignments of volunteers, docents, and park safety officers to provide a continual watch of the gibbon group during exhibit hours. Any concerns could be immediately reported to keeper staff.

On March 23, 1999, the group was given access to the exhibit for 3 hours. During this time keepers observed Indah removing Melouprey's limbs from her body on occasion but without serious incident. The next day, Melouprey was seen holding onto Indah with only one arm but also appeared curious, reaching out to touch the trees.

Over the next few weeks, the animals seemed to return to their normal routine. Indah and Melouprey were frequently seen sitting in the plastic crates and on April 2, 1999, Melouprey climbed off of Indah while in the crate. The last time we observed Indah pulling at his limbs was March 24, 1999. Over the past year, Melouprey has become very independent of his mother, plays regularly with Benny, and joins in when his parents call in the morning.

It is difficult to say what precipitated Indah's aberrant behavior towards Melouprey. Her behavior may be a result of being an inexperienced mother or a mother who disliked the feeling of having the infant cling to her. Despite what we observed, the infant appears to have developed and grown normally. Brookfield Zoo staff used a multi-disciplinary, team approach in preparing for all of the potential behavioral and husbandry scenarios we might have encountered. This criteria allowed us to carefully assess the animals' behavior with the goal of nonintervention unless absolutely necessary. We continue to investigate this incident and gather relevant information regarding unusual maternal behavior in gibbons.