

Hand raising a Southern White Rhinoceros calf (*Ceratotherium simum simum*) at Zoo Augsburg, Bavaria, Germany.

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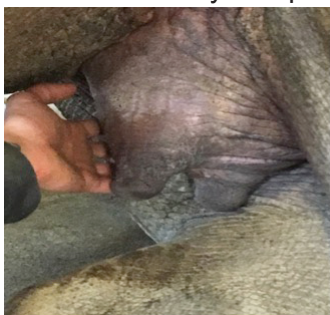
A male Southern white rhinoceros "Kibo" (*Ceratotherium simum simum*) was and at the time of writing continues to be hand-raised at Zoo Augsburg, Germany. This rhino being the first to be born and also hand raised at the Zoo.

Staff made a difficult decision along with the guidance of a birthing consultant from the Leibniz Institute for Zoo and Wildlife Research (IZW) to remove the calf from its mother "Kibibi" for hand-rearing, as there was a high possibility of severe physical injury or death if left with its mother due to her behaviour directly after birthing. This calf is the first offspring from Kibibi who arrived at Zoo Augsburg along with another female "Chris" in 2008 for the purpose of an eventual breeding programme.

Immediately after birth the behaviour shown by Kibibi was promising, cleaning and helping the calf to stand, it was only when the calf attempted to suckle did her behaviour change and become increasingly more nervous and aggressive.

It was noted by staff that Kibibi's milk started very shortly before birth only showing significantly 48-24hrs before birth, this caused the udders to swell drastically with Kibibi showing discomfort when touched in this area. Kibibi's behaviour after birth was believed to be due to this sudden swelling and the discomfort it caused.

A decision was made in an attempt to desensitise Kibibi to this touch-phobia that it should be attempted to milk her. Luckily due to previous blood draw training she was happy to stand in an improvised "race system" and allow staff to attempt to milk her, however these attempts were unsuccessful and she still did not allow staff to touch her in this area for any extended period.



The calf was born late evening on 06.02.2016 with Kibibi being stalled separately, the birthing area were two large boxes with concrete flooring covered in straw. However Kibibi has a close bond with the older female "Baby" and shows signs of distress when fully separated from her, so Baby was stalled next to her with a restricted contact doorway between them, allowing visual and limited physical contact at all times.

The calf was born with a normal birth presentation weighing 65kg, the mother recovered quickly and the after birth passed 2 hours later. Leading up to this birth, under advisement from the birthing consultant, Kibibi was on a reduced restricted hay & bran mix diet so to limit the size of the calf, however she was allowed to graze within the grass enclosure during the day or on ad lib straw at all times when stalled.

The health of the calf and mother was monitored closely during the pregnancy, regular (weekly and then daily) blood draws were introduced (taken from the ear) and the Bull "Bantu" was removed from the group approximately half way through the pregnancy as both pregnant females became aggressive towards him and would not tolerate or allow him close contact with them at any point and it was observed that his presence was only causing stress within the female grouping.



After the decision was made to remove Kibo from his mother, he was stalled alone within a large "bull box" constructed from concrete walls with only a small open barred area, next to the other pregnant female Chris. The box had underfloor heating (raised bed area) with panel heaters above and a deep litter straw substrate, the entire rhino barn is climatically controlled to maintain a constant 16 degrees Celsius however this can be manually adjusted as needed. During the first 4 weeks, staff members slept in the box with Kibo at night until it was deemed no longer necessary at which point a large Bean Bag was introduced, to which the calf slept on or near to from the start. During the first 3 days Kibo appeared to shiver occasionally so a large dog coat was modified for him to wear and then later a foal coat.

This was only worn at night or when outside of the barn due to the winter weather. However this coat was only needed occasionally for the first 3 weeks and was discarded after this.

At the point Kibo was removed from his mother for hand rearing a decision was made to sedate the mother and milk her, however only 200ml of colostrum was collected. This was given immediately to Kibo approximately 6 hours after birth, 200ml in one feeding with a second feeding of milk formula 30 minutes later. All formulas / feeding were always given separately with a 30 minute gap and never mixed together, all water used for the milk formula was boiled first and all bottles and feeding equipment was sterilised after use. When mixing the milk formula the powder was always added to cold water first then boiling water added so as not to destroy the quality of the powder.

The milk formula was heated to a temperature of between 37-38 degrees Celsius; the formula should not exceed this temperature however it was observed that Kibo preferred a cooler milk temperature. Initially a human baby bottle was used for the first day.

From this point, all feedings were recorded along with urine & defecation notes for the first 4 weeks with feeding schedules and daily body weight to be continually monitored and recorded until weaned.

The milk formula used –

- Foal Milk from Salvana 10g per 100ml
- 1 Tsp. Salvana elephant mineral per 24hrs, divided between feedings.

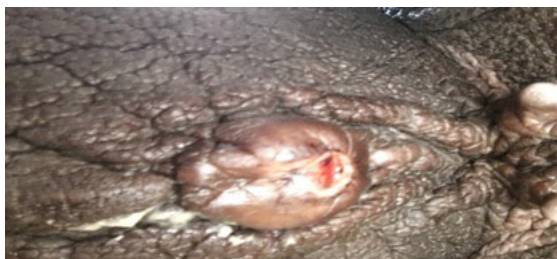
These quantities were given in gradual increments to avoid the possibility of diarrhoea allowing the calf to adjust to artificial milk.

On the 2nd and 3rd days, Colostrum taken from a female rhino at Zoo Salzburg was given to Kibo and warmed to 37 degrees Celsius - 100ml x 1 per day.

On the 4th and 5th day horse blood plasma was also given in between milk feeds again warmed to 37 degrees Celsius 100ml x 6 then 100ml x 4 the next day.

The milk formula was given at 10% body weight increasing to 15% on day 3, after the 8th day the milk formula was increased to 20% body weight. This was then reduced to 15% at 3 months old and then a further reduction to 13% at 4 months with the intent to reduce the volume of milk formula again to 8-10%.

Also on the 8th day the umbilicus dropped off cleanly, it was not disinfected after birth and was left to naturally dry and remove itself, only to be cleaned and area moisturised after dropping off.



6 days after birth Kibo was introduced to the outside enclosure, under supervision and encouraged to explore and exercise by himself a weight decrease of 6kg was recorded on this day. Short walks around the large enclosure accompanied by his main carers became a daily and frequent occurrence, due to the number of mosquitos and biting insects present it was noticed Kibo suffered a few bites. To rectify this, along with daily mud wallows, mudpacks containing crushed garlic were applied to the skin during high

mosquito periods, Kibo fortunately didn't suffer another bite. To stop the mudpacks from drying out or cracking the skin, a skin care routine was implemented where Kibo was washed with warm water. This was instantly a hit for him and now regularly receives a power shower from the high-pressure washer. From this point fresh water and soaked grass pellets were available to him ad lib.

At 8 weeks old, Kibo experienced a period of 10 days with diarrhoea,

Coincidentally Keeva (6 weeks old, raised by the mother) also had diarrhoea; therefore this was put down to an excess of protein as the rhinos were being given access to the fresh grass on the large enclosure.

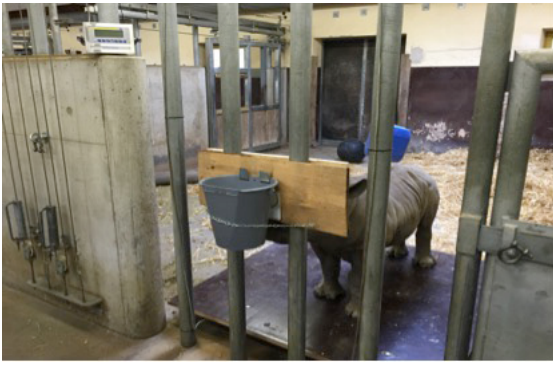
Kibo was then given: Lytafit – Electrolyte powder, 1/2 spoon (19g) per feed this was mixed in with the formula. Also warm water was offered via bottle between feeds to keep him hydrated.

It was also noticed at this stage Kibo had started to eat the faecal matter of the other rhinos, this was deemed ok and he was allowed to continue this behaviour as he wished.

At the time of writing, Kibo is 4 months old and 254 Kg. He is given normal hay, fresh grass and straw ad-lib also bran & grain mix (2L) is given along with grated carrot which he eats with no problem. The milk formula is presented in a feeding bucket fixed in front of a weigh scale.

Kibos first 24hrs feeding schedule:

- 02:30 – 200ml colostrum from Kibibi
- 03:00 – 100ml milk formula
- 06:00 – 100ml
- 08:00 – 150ml
- 10:00 – 200ml
- 11:45 – 250ml
- 13:45 – 250ml
- 15:50 – 250ml
- 18:00 – 250ml
- 20:00 – 300ml
- 22:00 – 350ml
- 02:00 – 500ml



Kibo will happily step up onto the scale to be weighed, he will also allow joint, ear, tail manipulation and full body inspection in preparation for future blood draws and foot care training.

Milk formula schedule at 4 months, 13% of total body weight:

- 06:00 – 6.0L Each feed contains 450g milk powder regardless of water quantity.
- 08:00 – 4.0L During the hand raising process, Kibo's future welfare was always foremost, his socialisation with the other rhinos and integration into the group was held as high priority.
- 10:00 – 4.0L
- 12:00 – 4.5L With this in mind he was relocated within the barn to a box next to his mother. The large wooden panels were removed in the interconnecting door at adult head height allowing his mother to put her head completely through the door but so that she was not able to hit or injure him.
- 15:00 – 4.0L
- 18:00 – 4.0L
- 22:00 – 6.0L



At 6 weeks old, during the day when the adults were outside Kibo was allowed to run freely with the staff in the barn during cleaning routines but also into a box where the adults could have restricted contact to him. This restricted contact continued each day for longer periods until 8 weeks old when he was introduced to Kibibi & Baby in a small holding area.



There was no form of aggression at all and Kibibi also exhibited play behaviour allowing horn on horn contact and push games. Baby would not allow this and Kibo quickly learned rhino etiquette.

During this introduction period Chris and her calf Keeva were also introduced to Kibibi and Baby. Once this was successful the same process again of restricted contact between Kibo - Chris & Keeva began. Initially Chris was very aggressive towards Kibo and would mock charge and loudly vocalise towards Kibo. Chris & Keeva were allowed to leave the space at anytime and slowly they became acclimatised to his presence.



At 4 months old, Kibo was introduced to all the rhinos Chris & Keeva, Baby & Kibibi in the same process as before, and has fitted in nicely into the herd and continues to go from strength to strength.