

## **Hard Work Really Does Pay Off**

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Let me introduce you to Emi, a female Sumatran Rhino at the Cincinnati Zoo & Botanical Garden. The Sumatran Rhino may be one of the most endangered species on the earth with less than 300 still in the rainforests of Malaysia and Indonesia, which they call home. Little is known about the habits, biology (reproductive status) and physiology of these prehistoric type animals. One reason is because they are so shy and secretive.

In 1984 a partnership was developed between Indonesia, Malaysia and four American Zoos which included the Cincinnati Zoo and Botanical Garden, to start a captive-breeding program. At that time a number of Sumatran rhinos were captured and put on reserves. By 1995 the Cincinnati Zoo and Botanical Garden had on loan two females (Emi from the Los Angeles Zoo and Rapunzel from the Bronx Zoo) plus our male (Ipuh) to try to breed because of our established success with breeding the Black Rhino. Not since 1889 at the Calcutta Zoo had a Sumatran rhino calf been conceived and born in captivity. Prior to 1996, when Dr. Terri Roth came to the Cincinnati Zoo and Botanical Garden as Director of C.R.E.W. (the Center for Conservation and Research of Endangered Wildlife), there had been no success getting the Sumatran Rhinos to breed. Dr. Roth, who has a Doctorate in reproductive physiology, had never worked with Sumatran rhinos before but with a grant for rhino research she naturally added them to her research. For the next five years with a lot of effort, research and hard work Dr. Roth would meet and try to overcome numerous challenges facing her with regards to Sumatran rhinos. One of the problems that were resolved was the diet. Sumatran rhinos are not grazers but browsers so the Zoo had to have fresh ficus browse flown in to feed them. Next it was determined that one of the females (Rapunzel) had inactive ovaries and therefore could not be used for breeding. Emi, the other female was younger and so she became the focus of attention.

Placing the male (Ipuh) together with Emi when she was not receptive for breeding resulted in aggressive behavior, which could have resulted in physical injury if continued. The next step then was to determine when Emi cycled so that the introductions between the two could be timed. Emi was trained to let the veterinary staff take blood from her ears and was conditioned to have ultrasounds done. For the next six months her levels of progesterone were measured and at the end it was still a mystery as to when she ovulated. Since it was the summer season and Ipuh who, when out in the exhibit, would spend most of his time in the water, it was decided to let Emi out also for short timed intervals. During these times both were observed by volunteers who recorded any interest, receptiveness and of course breeding that might occur between Emi and Ipuh. With the blood samples still being taken and ultrasounds being done it was discovered that she ovulated only after the breeding took place. This solved the mystery of why she had not ovulated before for it was thought that Sumatran Rhinos were spontaneous ovulators like the other rhinos, not induced ovulators like cats. Early pregnancy loss is not uncommon in rhinos so when Emi lost her first pregnancy Dr. Roth was not all that worried about it. However, when Emi continued to lose four more pregnancies in the next three years Dr. Roth was puzzled by questions that did not have answers. At one of the international meetings on rhino conservation, Emi's loss of pregnancies was discussed. This brought up the idea of hormone levels in pregnant Sumatran rhinos but there is no data available for comparison or to say what was normal. It was decided that on the next (sixth) pregnancy Emi would be given a hormone supplement. Since it was not known what would be an adequate amount Emi was closely monitored. The progesterone supplement, Regumate, was given from day 16 through day 465 of the pregnancy. The keepers found a great way to give Emi the supplement by injecting it into Wonder bread slices and she loved it. In fact we think she still looks for that particular "treat" even today. Emi's sixth pregnancy continued past the 90 days time period during which the previous pregnancies had ended.

She seemed to hold onto this one and in her eighth month the public was again notified that we had a pregnant Sumatran rhino.

With the eyes of the world on our Zoo and everyone wanting to see and know about the progress, a lot of changes had to occur. First the public exhibit in the CREW building was modified to have four monitors set up in a corner showing different angles of the two stalls to which Emi had access at night when inside. VCRs were also hooked up for the taping of behaviors and the birth when it happened. Our veterinary staff collected rhino plasma from the Indian rhinos living at The Wilds in Ohio. At the same time our nursery staff was preparing supplemental milk supply just in case the calf needed to be taken from the mother. The keepers, just like new parents, went about baby proofing the stalls and outside exhibit.

One of the biggest projects that went into play at this time was the call to the Zoo Volunteer Observers. These 58 volunteers are vital as a source of data collecting on animals at the Cincinnati Zoo and Botanical Garden during hours when the staff can not be there. The Zoo Volunteer Observers were called upon to observe Emi and Ipuh when they were put together for different time periods to mate. We are asked to use ethograms, recording what the animal is doing at certain timed intervals, make a call on behaviors to determine if a keeper (or vet) is needed and work all the odd hours of the day. We sometimes watch behaviors on a monitor, other times watching the animals themselves, sometimes at the keepers desk, sometimes standing or sitting in front of the exhibit and sometimes in the bathroom. We go wherever they can set up a space for us with the monitors. During Emi's pregnancy we were in front of the exhibit until Emi was put inside for the night and then we observed from the monitors in the public exhibit at CREW until the next morning when the keepers arrived. There are two volunteers who are in charge of working out schedules and making the calls to get everyone set up. Together they contributed over 2000 hours to this task. They make sure that nightwatch is notified of the change in shift to let the volunteers into the gates, that there are chairs and whatever else is needed for the volunteers during a shift and they also have a variety of candies for us to nibble on during the shift. At CREW there was one volunteer who helped the staff by opening and/or closing the building when the staff was unable to be there. On July 31, 2001 the Zoo Volunteer Observers started four-hour shifts from 4 PM until 8 AM every day until the calf was born.

On September 12<sup>th</sup> at 4 PM it was noted that Emi was becoming more restless and spraying urine a lot more than normal. The next morning she went into active labor lying down in the stall. At this point the public exhibit at CREW was packed full of volunteers and staff with their eyes glued to the monitors waiting like first time fathers for the baby to be born. Finally at 11:23AM the head and front feet came out and the calf started moving even before the back of him slid out of his mother. It was the moment we had all been waiting for and everyone continued to watch and see what Emi would do with this little bundle of joy she had just delivered. Well, at first we thought that this little squirming body in front of her puzzled her (for about three minutes) but then she started licking it and we all sighed, for Emi was indeed going to be a good mother. The calf was a male and his name is Andalas, the name of the Indonesian Island of Sumatra long ago when the forests were flourishing and the rhinos were plentiful.

This however did not mark the end of the Volunteer Observers' duties. We were called upon by CREW's animal behaviorist, Bernadette Plair, to continue to watch both mother and calf on a 24-hour basis for the first week. The reason we continue to observe the rhinos is because there is very little published on the raising and relationships between the Sumatran rhino mother and calf. Bernadette developed an ethogram with various behaviors we were to watch for at timed intervals. Many were basic behaviors like sleeping, nursing, drinking and eating. Other specific behaviors denoting interactions between the mother and calf included proximity, nasonasal contact, the calf climbing onto its mother, playing with mother and mother spraying urine in the stalls and outside in the exhibit. Behaviors were recorded at two-minute intervals during our shifts. This data is vital for future calves born both in captivity and in the wild. Frequency of nursing is important because if for some reason a calf has to be taken from its mother, we would know

how often it nurses and for how long. Through the nasonasal contact and some of the play between mother and calf, the calf develops motor skills and coordination and this usually is training for when the calf reaches adulthood. The urine spraying suggests that the mother is attempting to disguise the scent of the calf and possibly mark the trails for the calf. Another observed behavior was that the calf, at a very early age and still at nine months, eats browse hanging from the mother's mouth. References suggest that the calf is learning what is edible by smell and taste since the diet in the wild is very diverse. One of the fun things the keepers introduced was water spraying the animals with the hose, which Emi likes directed into her mouth. Andalas, who at first did not like the spray, eventually began lying down sternally and letting the keepers hose him down. The calf was also conditioned to let the staff make casts of his feet so that the footprints could be used to determine the age of Sumatran rhino calf footprints found in the wild. When walking in the wild the mother allows the calf to walk in front of her so she can cover up the footprints for protection of the calf. Andalas is growing very quickly. At birth he weighed 73 lbs. and has been gaining on average 2.5 lbs. per day. The frequency of his nursing once every 2-3 hours around the clock has not changed much from birth to nine months, however the duration has decreased from an average of 6 minutes to an average of 4 minutes and he is eating much more.

After the first week of 24-hour observation we dropped back to two four-hour shifts twice a day until November 10th. Then we began doing two two-hour shifts until April 4<sup>th</sup> when the calf was about six months old. During these months since the birth there have been and continues to be one 24-hour shift every four weeks. By April 4<sup>th</sup> the Zoo Volunteer Observers had contributed over 4000 hours of behavioral observation.

The birth of Andalas provides hope for the future of this species. All the information collected from before conception to the birth of Andalas is being shared and applied at reserves, like Sungai Dusan in Malaysia in hope that it will help future breeding of this species. This is an important example that sound scientific research; a good deal of perseverance and hard work can lead to real conservation achievements. A single birth is not going to save this species but it does provide other researchers and scientists with more information and hope that there is help for their survival. Science does play an important role in conservation and global partnerships are necessary for the success of endangered species.

I would like to end with a quote from our President and CEO, Greg Hudson: "The eyes of the world are literally turned our way because this Zoo refused to give up in its dedication to save this remarkable animal from extinction."

Thank you for reading our paper, we hope you enjoyed it and learned more about our work at the Cincinnati Zoo & Botanical Garden.