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The Plight of the Sumatran Rhino: A Conversation with Terri Roth, Vice President of Conservation and Science at the Cincinnati Zoo

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From gorillas to small cats, the Cincinnati Zoo has long been known for its great success breeding endangered species. This reputation has led to it being called the “sexiest zoo” by some reporters. Perhaps the Zoo's most renowned breeding success in its history was its Sumatran rhinoceros breeding program. It is the only zoo in America have ever successfully bred this species. These incredibly rare and elusive rhinos are critically endangered and distinctive because of their hairy appearance. The brilliant mind behind the zoo’s three births of Sumatran rhinos was Terri Roth, the Zoo’s Vice President of Conservation and Science. She directs the Center for Research of Endangered Wildlife (CREW), the Cincinnati Zoo’s cutting edge reproduction facility. Here is her story.

After getting her PhD in reproductive biology, Terri began her work at the National Zoo in Washington D.C. “There were only three Americans zoos at that time known for their reproduction programs: San Diego, National and Cincinnati,” she recalled. “When I first arrived at the National Zoo the reproduction program was primarily focused on felines. I hadn’t worked a lot on cats prior but ended up doing a lot with snow leopards and cheetahs. Then I found myself migrating back to hoofstock with the scimitar-horned oryx.” At the Zoo Roth met her longtime colleague and acclaimed biologist Bill Swanson. As a team they interviewed to go out to the Cincinnati Zoo and ended up moving there in 1996. “I had just gotten a grant to do rhino research when I came out here,” Roth said.

At the time, the Cincinnati Zoo had the last three Sumatran rhinos in America. Very little was known about their preferences, diet or reproductive behavior when they were brought in for managed breeding. “A group of seven had been rescued in the late 1980s/early 1990s from a forest being logged in Indonesia,” Roth explained. “People didn’t know much about Sumatran rhinos. They’re pure browsers and can’t do a hay diet so it took a long time for zoos to get their diet right. There were some issues about figuring out what to feed them, which was figured out right before I came here. Many of the rhinos were old so they were

not healthy or fertile to begin with. We only had one fertile female to work with for the breeding program at the Cincinnati Zoo."

Roth was determined to crack the code of the enigmatic Sumatran rhinos. She conducted immense research to figure out these endangered animals and understand their reproductive habits. "Science was so valuable to the Sumatran rhinoceros program," Roth elaborated. "The females doesn't always show estrus behavior and the males don't always show they're interested. They're a very solitary species and can fight aggressively when they are introduced to each other and the time is not exactly right. With such a valuable animal, people were really nervous to put them together. We trained our female for ultrasound exams so we could determine when she was about to ovulate." It took a long time to figure out the precise moment the female was ready.

Roth discovered Sumatran rhinos are induced ovulators, which "means they won't ovulate unless you put them with the male." She only discovered this after putting her in with the male. "We began to have more confidence when we put them in together at the right time and even if there was initial aggression we'd wait it out." Success took patience as the female got pregnant and had a miscarriage five times. "Each time it was within three months of gestation," Roth remarked. "We didn't see anything that let us conclude what the problem was. We put her on an oral hormone supplement the sixth time she got pregnant so the keepers could deliver a supplement in their food every morning. She didn't mind the taste of it and that was the pregnancy that finally went to term."

"We probably would not have successfully bred them if we hadn't learned so much about them," Roth reflected. Even more important, all the innovations and discoveries made with Sumatran rhinos at the Cincinnati Zoo got passed on to Indonesian biologists working to save the Sumatran rhino in their homeland. "They had also experienced early pregnancy loss during the first pregnancy," added Roth. "We took them through the steps and got them to use the exact same protocol."

In 2001, the Cincinnati Zoo finally welcomed the birth of a Sumatran rhinoceros. Two more followed in 2004 and 2007. "For the second two births we did not give the female hormone supplements," Roth commented. The first Sumatran rhino born at the Cincinnati Zoo ended up getting sent to Indonesia to contribute to the survival of his species. While unfortunately the second calf died when she was nine years old, the third calf followed his older brother to Indonesia in 2015 with the hope of breeding successfully. "The numbers of Sumatran rhinos are very desperate so you need to breed everything you can possibly breed," Roth elaborated. "We could have kept him here as an ambassador but we felt it was more important to send him to Indonesia to try to breed to save the species."

Although they are no longer at the zoo, the Cincinnati Zoo is not giving up on Sumatran rhinos. "Our participation in Indonesia has been strong since 1998," Roth stated. "They have a very competent team on the ground but they ask us for advice and suggestions. They can always bounce things off me as they go through these efforts. We communicate with the expertise of experience we have with Sumatran rhinos. Our zoo provides financial assistance to Sumatran rhinos to support the operations of the sanctuary in Indonesia." Recently, the first Sumatran rhinoceros born at the Cincinnati Zoo sired a calf continuing the cycle of saving the species.

CREW is determined to help save all rhinos from extinction. “Our rhino conservation program includes all rhino species,” Roth explained. “We’ve worked at developing artificial insemination with Indian rhinoceros. We shared our protocols for what we did with Sumatran rhinos to help the Toronto Zoo with pregnancy loss. We do a lot of semen banking and artificial insemination with Indian rhinos. We help zoos that either have a very aggressive male or an immature male but want to get their female pregnant. The bulk of this work initially went on at Cincinnati and we learned a lot about the reproductive habits of Indian rhinos. The black and white rhino research hasn’t been as extensive but we did do reproductive work with pregnancy diagnostics and studying iron overload disease which impacts browsing rhinos.”

As director of CREW, Terri Roth’s responsibilities primarily deal with “helping others on the ground.” In 2008, CREW started its polar bear reproduction research program and is working to help polar bears in zoos reproduce. “We’ve done fertility assessments, artificial inseminations and have a polar bear sperm bank,” she commented. “It is rare for a zoo to be as committed to reproductive research as the Cincinnati Zoo is with CREW. Our approach to conservation research is quality over quantity. We are not concerned with how many projects we’re involved in but we focus on making a significant impact on a few programs. We are very focused whereas many zoos are not. We pick our Signature Conservation Projects based on the needs of our community and the expertise of our staff. Most of our staff only work on our four Signature Projects: rhinos, polar bears, small cats or exceptional plants. We try not to spread ourselves too thin.”

Over the course of her career, Roth has become a legend in zoo reproductive science and research. “The most rewarding part of the job is the animals themselves,” she reflected. “We get the reward of seeing these baby animals that we reproduce. It’s amazing every time it happens. The biggest challenge is the amount of politics that goes into conservation. So often we know what’s best for a species but it doesn’t happen because of politics.”