



CREW ReView



Lindner Center for Conservation and Research of Endangered Wildlife • Cincinnati Zoo & Botanical Garden

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Roth's Remarks – CREW in the News



Dr. Terri L. Roth
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The role of modern day zoos is always evolving, and in today's world of impoverished wildlife populations and habitats, there is more pressure and need than ever before for zoos to step up their involvement in research and conservation. The goal of every CREW scientist is to conduct research that ultimately helps save endangered species. However, progress

often is slow in science, and many researchers wait a lifetime to realize major breakthroughs. Through their hard work, dedication, intelligence and relentless perseverance, CREW scientists have achieved an admirable list of notable accomplishments over the past decade. We rejoice over each and every one of these triumphs for the beneficial impact they will have on the plants and animals about which we care so passionately, but there is another byproduct of CREW's success that greatly benefits the entire greater Cincinnati region. CREW's scientific advances often

make headlines locally, nationally and internationally. This kind of recognition for CREW's substantive work conserving wildlife is exactly what draws attention to the Queen City and keeps the Cincinnati Zoo & Botanical Garden at the top of the list as a world leader among zoos. After all, new exhibits will eventually age, plants and animals will move in and out of the collection and events become memories, the species we save will become the lasting legacy of the Cincinnati Zoo & Botanical Garden.



Rhino Signature Project Updates

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Indian Rhino "Nikki" is Making History

Nikki, the Zoo's 15 year old Indian rhinoceros is about to do what no other endangered rhino has done, give birth to a calf produced through artificial insemination. CREW scientists developed the successful AI technique, and what makes Nikki's pregnancy even more important is the fact it



Ultrasound image of Nikki's pregnancy at Day 88 of gestation

was produced using frozen-thawed Indian rhino spermatozoa. This first time expectant rhino mom is due to give birth in late December 2007. As Nikki's due date approaches, CREW researchers continue to monitor urinary progesterone concentrations and regularly conduct ultrasound exams. In early December, a 24-hour birth watch on Nikki will begin. Zoo staff and dedicated volunteers will observe Nikki around the clock on monitors set up in the CREW public exhibit. Here they will record Nikki's activity and behavior in order to detect the first signs of labor. The milestone event will mark the first ever Indian rhino birth at the Cincinnati Zoo. Most important, it represents a significant birth for the conservation of this endangered rhino species. Poaching in Nepal and Assam, India has intensified over the past several years reducing the wild Indian rhino population to less than 2,000 animals. CREW's monumental scientific achievement with the Indian rhino comes at a critical time and will help facilitate captive gene pool management for the species to ensure a population that is healthy and self-sustaining.

Sumatran Rhino Three-peat Provides Hope for the Species

On April 29, 2007, the Cincinnati Zoo's world famous Sumatran rhino, Emi, delivered a healthy, 86-pound male calf. With this birth, Emi became the first Sumatran rhino in history to produce three calves in captivity. The calf was named "Harapan" by popular vote following a nation-wide naming contest. Harapan means "hope" in Indonesian (and the abbreviated "Harry" is a perfect nickname for the hairy rhinoceros calf).

As the only facility in the world successfully breeding this species, the Cincinnati Zoo & Botanical Garden has the distinction of being the leader of the Sumatran rhino captive breeding effort. This success is the direct result of two efforts: 1) the research conducted at CREW that unraveled the mystery of Sumatran rhino reproduction and, 2) the subsequent integration of that science into the intensive animal management program carried out diligently by the animal keeper staff.

In 2001, Emi gave birth to her first calf, Andalas. This was the first time in 112 years that a Sumatran rhino successfully reproduced in captivity. In February, Andalas made a historical trek back to his ancestral homeland of Sumatra to serve as the catalyst for the captive breeding effort in the species' homeland. In 2004, Emi produced a second healthy female calf, Suci, who still resides at the Cincinnati Zoo. Emi and Harry have been on exhibit most of the summer and have been extremely popular with the visitors.



"Harry", Emi's third calf born at the Cincinnati Zoo

The “Y’s” and “Y-Not’s” of Rhino Babies



Photo of a gel of separated DNA fragments from an assay of pregnant female rhinos. Genomic DNA isolated from the serum of the rhinos was run in duplicate to detect a Y chromosome specific gene. Note the banding pattern for pregnant Sumatran rhino Emi serum and the male serum control. Emi was 72 and 88 days pregnant with Harry when the serum samples were taken. Note no bands were produced from the serum of a pregnant white rhino that subsequently gave birth to a healthy female calf.

Just as in humans, the X and Y sex chromosomes of a rhino determines gender. Two X chromosomes make a female rhino, while an X and a Y chromosome make a male rhino. CREW scientists have developed a molecular technique that allows gender determination of a rhino calf while in utero simply by analyzing the blood of the mother rhino. Using serum collected from the pregnant rhino and exquisitely sensitive detection techniques, CREW scientists are able to determine whether the fetal DNA in the mother’s serum is derived from a gene on the Y chromosome - a DNA region that is only present in males. If this DNA is detected in the mother’s serum, then she must be carrying a male calf.

If there is no male DNA present, the calf must be female. To date, this rhino baby gender test has been 100% accurate and in fact, was used to determine the gender of our own Sumatran rhino, Harry, during gestation by analyzing the serum of his mother,



“Harapan” the male Sumatran rhino calf born to Emi after a 479 day gestation.

Emi. While CREW scientists are still collecting data for this study, it appears this test will provide a powerful management tool for institutions propagating rhinos. The ability to determine gender of rhino offspring will benefit zoos and each rhino Species Survival Plan by allowing more lead time for housing requirements and subsequent breeding recommendations. Besides, how else will zoo personnel find out whether they need to paint the rhino barn pink or blue!

Emi and the Rhino Scientist Debuts

Emi and the Rhino Scientist is a new 64-page book for young people that tells the amazing story of how CREW Director, Terri Roth, helped Emi become the world’s most famous Sumatran rhino mom. The book features more than 80 full-color photographs of Emi and her family as well as CREW and Cincinnati Zoo staff at work. Although the book’s focus is Emi’s story, it also incorporates photos and valuable information about the other four rhino species. Houghton Mifflin is publishing the book as part of their award-winning Scientists in the Field series. The book was launched in Cincinnati in October and is available at many local bookstores and on Amazon.com. Check out the author’s website (www.marykaycarson.com) for more information. If you love rhinos, wonder how zoos are helping to save endangered species, know a budding scientist, or just enjoy good wildlife photography, you won’t want to miss this book!

Mary Kay Carson is a writer and author of seven books for young people, including *Exploring the Solar System* and *The Wright Brothers for Dummies*. She attended a year of high school at the Cincinnati Zoo Academy and studied biology in college. You can learn more about her books and her website on her website at www.marykaycarson.com.

Tim Uhlman has been a freelance photographer for almost seven years. He photographs lots of news and sports events for newspapers and magazines, and does wildlife photography most of all. You can see more of his photos at www.tomphoto.com.

Mary Kay and Tim first wrote about and photographed Emi for a magazine article about breeding captive rhinos after Amalia was born in 2003. How the pair earned and lost a century-old house surrounded by deer, hawks, woodchucks, songbirds, and other creatures in Cincinnati, Ohio.

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EMMI
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