



Bon Voyage, Harapan

photo by Jim McCurry

photo by Michelle Curley



Roth's Remarks

Dr. Terri L. Roth
VP of Conservation & Science and Director of CREW

By the time you read this 2015 issue of the CREW ReView, our last Sumatran rhino "Harapan" may already be in Sumatra, or if not, he soon will be. His departure marks the end of an era for the Cincinnati Zoo & Botanical Garden. For a quarter century, we devoted ourselves to these rare and amazing rhinos, committed to ensuring that our rhinos here in Cincinnati contributed to the survival of their species. Through it all, we experienced amazing highs, like the birth of our first calf "Andalas," and heart-wrenching lows, like the loss of our second calf "Suci" before her tenth birthday. When I think back on our history with this species at our zoo - the first successful matings, the pregnancies, the pregnancies that were lost prematurely, the calves that were born here, the rhinos that passed away here, and the rhinos that were sent to Indonesia - it understandably conjures up quite a mix of emotions. When asked how I feel about it all coming to an end here in Cincinnati, the lyrics of a particular song float through my head. I am not necessarily a big country western fan, but the refrain from the song "the Dance" by Garth Brooks, just seems to sum it all up for me:

"And now, I'm glad I didn't know, the way it all would end, the way it all would go. Our lives, are better left to chance, I could have missed the pain, but I'd have had to miss...the...dance."

And, what a dance it was!

Travel safe, Harapan, and make us all proud in Indonesia. It's your dance now.

RHINO SIGNATURE PROJECT UPDATES



Life Beyond the Grave for Rhinos

Within CREW's CryoBioBank lie numerous biological samples that have been carefully collected, processed and cryopreserved for future use in producing genetically valuable progeny of endangered plants and animals. One subset of these collections is the rhino sperm bank, which consists of samples obtained from live rhinos in addition to samples rescued from the reproductive tissues after a rhino dies. Samples from the latter offer an opportunity to extend a rhino's genetic lifespan, but only if the sperm quality is high enough that the cells survive and maintain their functional capacity post-thaw. Recently, the results of CREW's rhino sperm rescue attempts conducted over the past 16 years were summarized, and the conclusions were encouraging. Over half of the 21 rescue attempts yielded viable samples adequate for cryopreservation. Neither cause of death nor age of rhino appeared to hinder rescue attempts, and quality samples could be obtained up to 51 hours after a rhino died if tissues were removed promptly and stored appropriately during shipping. Initial post-thaw assessments of the samples indicated sperm motility decreased only 15% compared to pre-freeze values (41% versus 56%, respectively). In conclusion, sperm recovery post-mortem is relatively successful and may give rhinos a chance to contribute to their species beyond their living tenure.

A RARE Endeavor

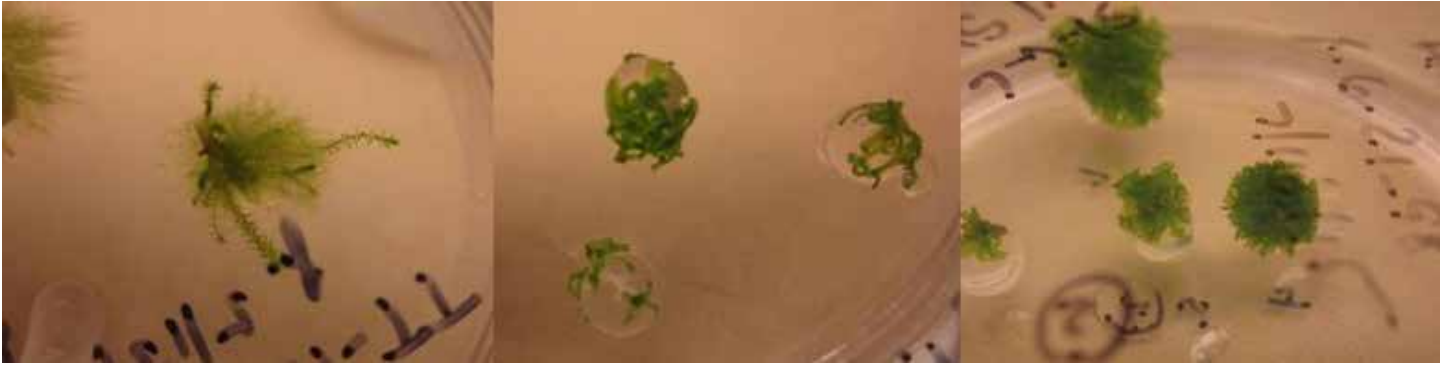
With a history of verified results from collaborative research, CREW scientists understand the importance of developing scientific capacity within individuals and organizations throughout North America to overcome the serious loss of genetic diversity facing captive African and Asian rhino populations. In the first year of a three-year National Leadership Grant from the Institute of Museum and Library Services (IMLS), CREW has begun building a Rhino Assisted Reproduction Enterprise (RARE) in collaboration with SeaWorld Busch Gardens Reproductive Research Center and several other AZA zoos. These zoos contribute the veterinary and rhino keeper staff time needed to learn and implement rhino assisted reproductive techniques, with the necessary training, tools and laboratory support provided by CREW. One objective of the grant is to contribute to the

Dr. Monica Stoops (CREW) and Dr. Anneke Moresco (Denver Zoo) discuss results of an ultrasound exam conducted on a sedated female Indian rhino.



genetic management and propagation of captive Indian rhinos through AI. Although AI in Indian rhinos is still a work in progress, the achievements made during CREW's initial 8-year effort are impressive with six conceptions and four term calves produced. Because there is a steep learning curve to these procedures, we are hopeful that success will become even more common over time. Participating zoos agree to collect and ship rhino urine samples on a frequent basis to CREW for hormone analysis needed to time AI. Rhino keeper staff at each facility condition females to enter a chute for the purpose of performing AI and the standing sedation protocol already established for successful intrauterine AI in this species is implemented prior to expected ovulation date. Each facility observes one AI before performing the next AI under CREW supervision. We are happy to report that the Denver Zoo team is now fully trained in Indian rhino AI and is performing procedures in house using sperm from CREW's CryoBioBank. Our long-term commitment to rhino conservation has positioned us to respond to the growing need of zoos to build their capacity for assisted reproductive technology for rhinos. We are gladly meeting this challenge and enjoying establishing a network of RARE researchers united for a common cause - to save rhinos. A RARE endeavor indeed.

SAVING SPECIES WITH SCIENCE®



Gametophytes of moss (left), liverwort (middle) and fern (right) growing in vitro after two decades of storage in liquid nitrogen.

Green Growing Gametophytes!

Which is more likely to survive freezing at -196°C : the tip of a flowering plant, with its protective leaves, or a sheet of plant cells only one cell-layer thick? If you said the latter, you would be correct. Those plant cells are part of a “gametophyte,” the tiny plant in the life cycle of ferns and bryophytes (mosses and liverworts) that germinates from a spore. While gametophytes appear very fragile, they have developed survival strategies that make them good subjects for cryostorage. As part of the Plant Division’s study of long-term survival in CREW’s CryoBioBank, samples of fern, moss, and liverwort gametophytes that had been stored for 2-21 years were thawed and put onto nutrient medium. These samples had been frozen using a protective method known as encapsulation dehydration and had shown survival after 1 hr in liquid nitrogen, but no one knew if they would grow after years of storage. However, within a few days of thawing, the samples began to turn bright green and grow. Of nine fern, three liverwort, and three moss species, all but one have shown good growth after their long years in storage. These results provide evidence that the encapsulation dehydration procedure can preserve gametophytes of both ferns and bryophytes with little or no loss of viability for many years. Samples that remain in CREW’s CryoBioBank will be available for future studies of viability after even longer storage times. *(Funded, in part, by a grant from the Institute of Museum and Library Services)*



Dr. Pollock and CZBG’s black rhino ‘Seyia’.

She’s a Jolly CREW Fellow

CREW welcomed its newest post-doctoral fellow, Dr. Kelly Pollock, in the summer of 2015. Dr. Pollock completed her Ph.D. at the University of Missouri, where she conducted research to elucidate the effects of leptin on placental development, function and offspring behavior. With support from her husband and 3-year-old son, Dr. Pollock’s family relocated to the Queen City area and now call Northern Kentucky home. A primary focus of Dr. Pollock will be to develop novel research addressing reasons for suboptimal reproduction in captive African and Asian rhinoceros species, and she currently has two such projects underway. In one study, she is examining the relationship between anti-mullerian hormone and ovarian reserves. Results from this study may provide valuable insight on how to proceed with the reproductive management of older captive rhinoceros species, particularly the African white rhinoceros. The second study will determine how pre-transport olfactory exposure of new black rhinoceros breeding pairs affects post-transport acclimation and reproductive success. Developing and optimizing strategies to

improve breeding success is imperative for attaining sustainable captive rhino populations. *(Funding for Dr. Pollock’s fellowship has been provided through a grant from the Institute of Museum and Library Services and a gift from Elizabeth Hoffman).*

SAVING SPECIES WITH SCIENCE®

The End of an Era for the Cincinnati Zoo &

CINCINNATI ENQUIRER

Friday, October 11, 2007

Zoo awaits wrinkly baby of the century

By Jim Knipfensberg

It's the Cincinnati Zoo's Sumatran rhino, Emi, who's the star of the show. She's the only one of her kind in captivity here, and she's about to give birth to a baby that's expected to weigh 30-40 pounds.

Zoo's prized rhino loses pregnancy

By Jim Knipfensberg

Emi, the Cincinnati Zoo's Sumatran rhino, has lost her baby. It was due in January 2007.

Dr. Terri Roth, director of the Center for Research of Endangered Wildlife at the Cincinnati Zoo and Botanical Garden, says she's not sure why the embryo died. "The pregnancy was successful, but the embryo failed to implant the wall of the uterus."

Cincinnati Enquirer July 2, 1997

City's rare rhino miscarries again

Emi 1 of only 17 Sumatrans in zoos

Emi, a Sumatran rhino, can breed again, the zoo thinks.

Cincinnati Post

OCT 7-00

200 RHINO EXPECTING



CINCINNATI POST
CINCINNATI, OH
PM CIRC. - 79,143

Cincinnati | Baby rhino debuts at zoo



Emi, a rare Sumatran rhino, is photographed with her new baby boy, an endangered species.

SUNDAY MAGAZINE

Will This Rhino Save Her Species?

By Vinca P. Groll



Whoa, mamma! Zoo's rare rhino is pregnant

Birth would make Sumatran history

By Jim Knipfensberg

Emi, the Cincinnati Zoo and Botanical Garden's 8-year-old Sumatran rhinoceros, is pregnant and due in the fall of 1999.

Cincinnati zoo's Sumatran rhino pregnant for sixth time

The Associated Press

Emi, a Sumatran rhino, can breed again, the zoo thinks.

Cincinnati Post

SEPT-23-00

Rhino pregnant

The Cincinnati Zoo's 10-year-old Sumatran rhinoceros, Emi, is four months pregnant.

Rare rhino pregnancy fuels hope for endangered species

CNN

When the rare Sumatran rhino gives birth, it will give the world a new reason to hope for the survival of the species.

IN SPORTS, CO

TPC at RIVER'S BEND USES WHAT NATURE PROVIDED

THE CINCINNATI ENQUIRER

THURSDAY, AUGUST 2, 2001

Zoo awaits rare birth of Sumatran rhino

Mother Emi under watch for signs of starting labor

globalpost

Rare Sumatran rhino born in India

A Sumatran rhino calf, one of the world's most endangered species.

METRO

Endangered rhino's birth called 'epochal'

The birth of a Sumatran rhino calf is called an epochal event.

globalpost

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A Sumatran rhino calf, one of the world's most endangered species.

NATIONAL GEOGRAPHIC

It's a Boy!

The new-born Sumatran rhino calf is the first of its kind in captivity here.

TIME FOR KIDS

A Baby Boy!

An Ohio zoo is excited about its new baby rhino.

Discover

How to Breed Rhinos

Discover how to breed rhinos.

CINCINNATI ENQUIRER

SATURDAY, MAY 31, 2008

Zoo's Emi gives birth to a daughter

Rare Sumatran rhino makes history

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"The Cincinnati Zoo has had a profound, historic impact on the effort to save this species."
Dr. Terri Roth, CREW Director

Botanical Garden



MISSION POSSIBLE

A 60-Hour Trek to Save a Species

BBC

Hopes of rare Sumatran rhino birth dashed
By Kamuhina Virengi
BBC News, Jakarta

Efforts to save the critically endangered Sumatran rhino in Indonesia have hit a major stumbling block.

Conservationists say it appears that a female rhino that had become pregnant in captivity has had a miscarriage.

It is estimated that there are only 200 Sumatran rhinos left in the wild.

Jakarta Post

Conservationists newly born Sumatran rhino

NATIONAL

A pair of Sumatran rhinos in captivity show the odds

The Washington Post

Harapan, the Western Hemisphere's last Sumatran rhino, is leaving for Indonesia
By Andy Oshroff

Play Video 1:44

The Jakarta Post.com Top Latest News

Double Valentine Treas

U.S. born-Sumatran Rhino arrives in Indonesia
February 21, 2017

WAY KAMBAS NATIONAL PARK, Lampung (AP) — After traveling around the world by plane, ferry and truck, a Sumatran rhino born at a U.S. zoo slowly backed out of his crate into a sanctuary of his native island Wednesday.

RARE BREED

On the left end
And the bottom right
"We and the top side"

CALL OF THE WILD
Expectations high for endangered rhino's first dates

The Sumatran rhino is considered the most threatened of the five rhino species, with fewer than 100 left alive in isolated pockets in the forests of Sumatra and Borneo, which is also being lost to deforestation and agriculture.

Conservationists are hopeful, saying continued efforts in Borneo and Sumatra have led to the breeding of rhinos in those countries.

But they also recognize progress may be slow due to bringing females back to Sumatra and greater political will to stop poaching and forest encroachment and removal of rhinos to zoos.

Rhinos were first seen in 2011 in the 1,000-hectare (2,500-acre) Bukit Barisan National Park, the first time in over 100 years that rhinos have been sighted in Sumatra.

COVER STORY

Zoo's discoveries offer hope for Sumatran rhinos

THE CINCINNATI ENQUIRER

LAST CHANCE FOR THESE RHINOS?

Sumatran rhino expecting 2nd calf in May at Indonesian sanctuary for highly endangered species

Published September 23, 2015 • Associated Press

JAKARTA, Indonesia — A Sumatran rhinoceros is pregnant with her second calf at an Indonesian sanctuary in the original habitat of the highly endangered species.

Ratu's first calf, a male born in 2012, was the first Sumatran rhino born in an Asian breeding facility in more than 140 years.

A government conservation official, Bambang Danono Adi, said Wednesday that Ratu was expected to give birth next May at Way Kambas National Park in southern Sumatra.



New Hope for the Species

Despite the plethora of press about the dire situation facing Sumatran rhinos these days, there is also some wonderful news being heralded from the forest of Sumatra thanks to Andalas, the first calf produced at the Cincinnati Zoo, and his feisty mate, Ratu. During Dr. Terri Roth's visit to the Sumatran Rhino Sanctuary in January/February of 2015, Andalas and Ratu mated for the first time since 2011, when Ratu became pregnant with Andatu. That one and only mating in January 2015, resulted in conception confirmed via the presence of an early embryonic vesicle observed during an ultrasound exam conducted by Dr. Zulfi at the Sanctuary just prior to Dr. Roth's departure. However, due to the prevalence of early embryo loss in this rhino species, the team decided it was best to keep the wonderful news under wraps until everyone felt more confident that the pregnancy was healthy and likely to develop to term. On World Rhino Day (Sept. 22nd), Ratu reached the mid-term milestone of her gestation, and Indonesia decided the time was right to share the exciting news with the world in a press release claiming "New hope for the species". Ratu is expected to deliver her calf in May, 2016. If all goes well, this will be Andalas's second offspring since he arrived in Sumatra from the LA Zoo in 2007, and the fifth calf derived from the Cincinnati Zoo's original breeding pair. Fingers crossed for good news out of Sumatra next spring.