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The Birth of Andalus- A Spark of Hope for An Imperiled Species



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On September 13, 2001, at 11:23 AM, a 72.6 lb. hairy Sumatran rhinoceros calf was welcomed into the world at the Cincinnati Zoo & Botanical Garden, igniting a spark of hope for the future of a species. The birth of this healthy rhino calf represents a conservation milestone, a product of the cooperative international effort to save the Sumatran rhino from extinction spearheaded by the International Rhino Foundation (IRF) and involving American, Malaysian and Indonesian organizations. Not since 1889 had a Sumatran rhino successfully reproduced in captivity, despite the initiation of a formal captive breeding program in 1984. With only 300 animals estimated to survive in the wild and a mere 14 adults in captivity, Sumatran rhinos are truly a species in crisis; one of the most endangered mammals on earth today. Although a single calf will not save a species, this birth has been called "epochal" by Dr. Tom Foose, Program Officer of the IRF, in part, because it is living proof that we finally have unraveled the mysteries of breeding this species in captivity.

For years, the Sumatran rhino has challenged animal managers. Initially, keeping the animals healthy in captivity was difficult because nutritional requirements were poorly understood. By 1995, dietary needs had been largely identified but only three of the original seven Sumatran rhinos loaned to the U.S. from the Indonesian government still existed, and they were located in three different zoos. In accordance with Sumatran rhino Species Survival Plan recommendations, the Los Angeles and Bronx Zoos sent their female rhinos to the lone male at the Cincinnati Zoo for a final effort to breed this species in North America. Although the animals remained healthy, the key to breeding them initially alluded us and the scientific challenge of breeding the Sumatran

rhino in captivity developed into a five-year project of the Cincinnati Zoo's Center for Conservation and Research of Endangered Wildlife.

Because the Sumatran rhinos at Cincinnati do not exhibit reliable behavioral changes when the female is in estrus, it was difficult to appropriately time introductions with the male. If the animals were paired when the female was not receptive, the male typically would chase her aggressively. In 1996, research was initiated at Cincinnati to answer three primary questions: Are the two female rhinos reproductively active? How long is the Sumatran rhino reproductive cycle? When is the right time to pair animals for breeding?

To evaluate their reproductive status, female rhinos were conditioned to allow rectal ultrasound examinations and blood collection from the ear vein for hormone analysis. It soon became clear that the younger (7 year old) female, Emi, exhibited some ovarian activity and had a normal reproductive tract. In contrast, the older female contained a large uterine mass and inactive ovaries, so further research and breeding efforts focused on the younger animal.

Answering the second question regarding the length of the reproductive cycle proved challenging. Ultrasound examinations were conducted 3-5 times each week and blood was collected twice weekly for progesterone analysis. However, ovulation was never observed and although progesterone concentrations fluxuated, there was no distinct cyclical pattern.

After months of intensive monitoring, it was decided that a new strategy must be adopted to gain additional information. Daily introductions between the male, Ipuh, and Emi were initiated. However, the animals were placed together for only 5-60 minutes and were under constant surveillance so that they could be separated as soon as aggression was observed. One day, after 40 days of this routine, the male exhibited interest in the female without aggression, followed her around the enclosure, eventually mounted her and attempted to breed. Although he tried for hours, this first attempt at mating the

female failed. However, an ultrasound examination 2 days later confirmed ovulation for the first time since the ultrasound work had been initiated 8 months earlier. This event was key in determining that the female was an induced ovulator (i.e., ovulates only after mating). This finding was surprising because, to our knowledge, the other three studied rhino species ovulate spontaneously at fairly regular intervals regardless of male interaction. This unexpected discovery was critical in developing a safe, reliable captive breeding protocol for the Sumatran rhinos at the Cincinnati Zoo.

In September of 1997, Ipuh tried to breed Emi for the second time and this time was successful. Two days later Emi ovulated, and at day 14, pregnancy was diagnosed by confirming the presence of an embryo with ultrasound. Although subsequent examinations indicated that the embryo was developing normally, an ultrasound exam on day 42 of gestation confirmed that early embryo loss had occurred. As disappointing as this was, there was optimism that Emi and Ipuh could now be bred safely and that the next pregnancy would be successful. Unfortunately, that was not to be the case.

With the scientific database accumulated in the first year of intensive ultrasound and endocrine monitoring, it was possible to develop a breeding program that reduced risks of aggressive interactions between the pair of rhinos. Emi and Ipuh were introduced for breeding only when the ovaries contained a follicle that was 20-25 mm in diameter and serum progesterone levels were baseline (<100 pg/ml). Over the next two and a half years, this pair of rhinos mated 20 times producing a total of 5 pregnancies, but all were lost within the first three months of gestation with no clinical indication as to cause.

In 1999 and 2000, the IRF organized Sumatran Rhino Master Planning Workshops in Malaysia and Indonesia. These workshops involving scientists, animal managers, and wildlife officials, provided a venue for sharing information and making logical recommendations for each captive animal. At the March 2000 meeting at the Bogor Agricultural University and Universiti

Putra Malaysia, it was decided that the female Sumatran rhino in Cincinnati should be supplemented with a hormone (progesterone) to help support her next pregnancy. When Emi became pregnant for the 6th time, she was prescribed an oral progesterone supplement fed daily from day 16 to day 465 of gestation. The pregnancy was monitored closely by ultrasound and hormone analysis until the birth of the male calf at 475 days. The labor was uncomplicated, the calf is strong, and as a first-time mother, Emi has shown exemplary care of her newborn. On October 16, 2001, Ir. Wahyudi Wardoyo, Director General of Forest Protection and Nature Conservation of Indonesia named the calf "Andalas" which was the name of the island "Sumatra" millions of years ago when rhinos probably existed safely and in large numbers.

The Cincinnati Zoo & Botanical Garden is honored to be a partner in the international effort to save the Sumatran rhino. The information gained from studying Emi and Ipuh at the Cincinnati Zoo has already proven useful in efforts to breed the Sumatran rhinos at the Sungai Dusun Sumatran Rhino Conservation Centre in Malaysia where 4 of the 5 females have successfully mated with a male in the last 18 months. Hopefully, the knowledge accumulated through the use of reproductive science and technology and years of dedicated effort will benefit the breeding programs in Indonesia and Malaysia as it has in Cincinnati, and many more Sumatran rhino calves will be born.

The Cincinnati Zoo & Botanical Garden is excited and proud of the birth of this Sumatran rhino calf, Andalas. This animal is so much more than just another cute baby - this calf is a celebration of science, of inter-institutional collaboration and international partnerships. It is the culmination of cooperative efforts, and it represents the spirit of the many who have persevered in this effort.