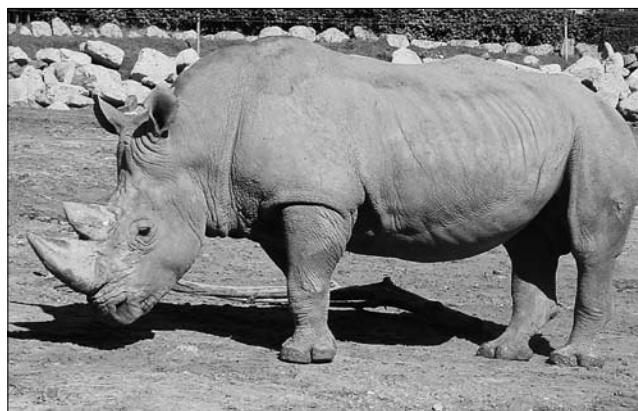


Assisted reproduction in a captive southern white rhino; pioneering techniques using formerly frozen sperm

Clive Barwick, Colchester Zoo, United Kingdom



Colchester zoo has been working cooperatively with the Institute for Zoo and Wildlife Research in Berlin for several years, mostly regarding assisted reproduction in its African elephants (*Loxodonta africana*) and southern white rhinos (*Ceratotherium simum simum*). The zoo was pleased to be asked for permission to use stored semen from its white rhino male 'Simba' for an artificial insemination procedure in a female white rhino in Budapest Zoo, Hungary.

Semen had been collected from Simba (then 35 year old) a few years earlier and stored in liquid nitrogen at -196°C at the Institute for Zoo and Wildlife Research (IZW). In June 2007, a team from IZW including Thomas Hildebrandt, Robert Hermes and Frank Goeritz, visited Budapest Zoo to carry out an artificial insemination (A.I.) procedure in their white rhino 'Lulu'. Lulu had recently given birth to a healthy calf also conceived by A.I., however, on that occasion fresh semen from Budapest Zoo's own male white rhino was used. This was a world's first successful birth of a white rhino using A.I. (see EAZA News 58, page 13).

Due date

As the post partum oestrus is supposedly very fertile, and it is then technically easy to perform A.I., the team from IZW planned to carry out the A.I. procedure during this period.

Earlier analysis had shown that Simba's sperm, collected via the use of electro ejaculation, was indeed highly vital, despite his senior years. Simba's sperm was thawed from its storage temperature of -196°C and the cells were then placed deep into Lulu's uterus, using a non-surgical procedure developed at IZW. Faecal hormone analysis on Lulu, carried out at the Veterinary University of Vienna, Austria, had shown signs of pregnancy. An ultrasonography examination was performed on Lulu by Robert Hermes approximately four months from the date of the A.I. procedure. This revealed that the insemination was indeed successful and confirmed that a foetus was developing, with a November 2008 due date.

Benefits for conservation

This is the first case in which previously frozen sperm has successfully been used in an A.I. procedure in a rhinoceros, and as such, may have wide ranging benefits for assisted reproduction in both *ex situ* and *in situ* conservation programmes. The southern white rhino is neither an abundant or widespread species and is currently listed as 'Near Threatened' (IUCN, 2007).

Increased poaching pressure on this species could elevate it to a higher level of concern, as is current with the Indian rhinoceros (*Rhinoceros unicornis*),

which is endangered, and the Sumatran rhinoceros (*Dicerorhinus sumatrensis*), black rhinoceros (*Diceros bicornis*) and the Javan rhinoceros (*Rhinoceros sondaicus*); all listed as 'Critically Endangered' (IUCN, 2007). Therefore, any advancement in assisted reproduction that is applicable for use in these species can be viewed as a positive step forward in the conservation of highly vulnerable taxa. The northern white rhinoceros (*Ceratotherium simum cottoni*) is critically endangered with fewer than five wild living individuals surviving in the Garamba National Park in the Democratic Republic of Congo (International Rhino Foundation, 2007). This northern race went into a dramatic decline during the 1970's and 1980's due to heavy poaching pressure, particularly during the civil war years, but made a slight recovery during the 1990's and into 2003. However, renewed poaching activities in this region during the past few years has brought this vulnerable population to the brink of extinction.

Saving valuable genetic material

With only eight individuals known to be surviving in the world's zoos, the future survival of the northern white rhinoceros may be more likely with the assisted reproductive techniques developed by IZW. It may be possible to collect sperm from the remaining free ranging individuals and deep-freeze it using the same methods employed for Simba's sperm samples. The sperm could be used in A.I. procedures in the *ex situ* population of northern white rhinoceros. It will mean that valuable genetic material is not lost forever, should the remaining wild living individuals succumb to the same fate as many of their predecessors. •

