

Consortium announces five new northern white rhinoceros embryos created

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Northern white rhino Fatu and southern white rhino Tauwo after the procedure.
Credit: Jan Zwilling

Three years after starting its ambitious program to save the northern white rhino from extinction through advanced assisted reproduction technologies, the BioRescue consortium draws a positive interim conclusion: Following the 10th event of harvesting immature egg cells (oocytes) in the northern white rhino female Fatu, the international team produced five additional embryos—bringing the total to 22 sired by two bulls.

This nourishes the hope to eventually succeed in producing new offspring and give a keystone grazer of Central Africa a new future. At the same time, the consortium places the highest value on respecting the life and welfare of the individual animals involved. Regular veterinary and ethical assessments of oocyte collection procedures show that Fatu handles the procedures well and shows no signs of detrimental health effects.

The 10th oocyte collection in northern white rhinos (NWR) was performed by a team of scientists and conservationists from the Leibniz Institute for Zoo and Wildlife Research (Leibniz-IZW), Ol Pejeta Conservancy, Safari Park Dvůr Králové, Kenya Wildlife Service (KWS) & Wildlife Research and Training Institute (WRTI) on July 28, 2022, at Ol Pejeta Conservancy in Kenya. The BioRescue team was able to collect 23 oocytes from Fatu, the younger of the two remaining NWR females.

Oocyte collections from Najin, Fatu's mother, were ceased in 2021 following an in-depth ethical risk assessment. The oocytes were immediately air-lifted to the Avantea laboratory in Cremona, Italy. Following maturation, seven of the oocytes were fertilized using cryopreserved, thawed semen from the deceased NWR male Angalifu. Eventually, five embryos of Fatu were successfully produced and cryopreserved in liquid nitrogen.

This collection followed on from the 9th oocyte collection held at the same location and by the same team on April 24th. Out of 16 collected oocytes, three embryos were produced in the Avantea laboratory, again using the semen of Angalifu. Successful results of both procedures raised the total number of NWR embryos produced to 22—all of them from female Fatu, with half of them sired by the deceased male Suni who was born in Safari Park Dvůr Králové, Czech Republic, and the other half sired by Angalifu who lived in San Diego Zoo Safari Park, U.S..

Once the protocol to transfer the embryos to surrogate southern white rhino (SWR) female recipients is optimized, the embryos will be the foundation of a new NWR population, eventually destined to step back into their ecological role as keystone grazers in Central Africa.

To set up suitable conditions for a successful embryo transfer, the team has been carefully following the interactions of the sterilized SWR bull Owuan, who serves as the oestrus detector, with the possible surrogate females that share an enclosure with him. Once the conditions allow it, the BioRescue team will attempt to conduct an embryo transfer—first with SWR embryos to demonstrate that the whole procedure works properly before the team uses the extremely valuable NWR embryos. The team is currently considering whether adding more SWR females to the program might increase the chance of achieving the first successful embryo transfer.

Thomas Hildebrandt, BioRescue project leader and head of Department of Reproduction Management at Leibniz-IZW, says that "in 2019, one day before our worldwide first oocyte collection in NWR I said—tomorrow we will change the world. Today I can say, we did: The 5 new NWR embryos created in one set of procedures are a new record in our mission to save the NWR from the brink of extinction. In total, we managed to produce and cryopreserve 22 pure NWR embryos from

158 oocytes collected during 10 collections: 148 from Fatu and 10 from Nájin. Our next aim is to successfully produce viable offspring by inventing and using new scientific embryo transfer methods and techniques. The ground breaking scientific work we are establishing here will lay the groundwork for future conservation rescue initiatives."

Jan Stejskal, director of international projects at Safari Park Dvůr Králové says that "obtaining 22 [northern white rhino](#) embryos in three years is a fantastic achievement. However, we have to continue in producing NWR embryos as more embryos simply mean a higher chance to see a NWR baby born in the future. Thanks to the cooperation with the European Association of Zoos and Aquaria, we have [southern white rhino](#) embryos available for our next embryo transfer attempts. While we would love to have a NWR calf as soon as possible, it is necessary to proceed carefully and use the unique NWR embryos only after we achieved a pregnancy with the more easily accessible SWR embryos."

Cesare Galli, Director of Avantea says that "the new results and the continuous successes of the previous series of collections show that we have developed a remarkably reliable process from the harvesting of the oocytes via transport to maturation, fertilization, embryo culture and freezing. Following these routines, we can expect a similar number of oocytes harvested and embryos produced in the upcoming three years."

Susanne Holtze, Scientist at the Leibniz-IZW says that "the new results are also reassuring and promising in a different way. We see absolutely no signs of detrimental health effects of repeated oocyte collections in Fatu. The outcomes of the procedures are constant, but the last collection with 23 oocytes has been the most successful in terms of numbers of harvested oocytes that our team ever conducted in northern white rhinos."

Barbara de Mori, Director of the Ethics Laboratory for Veterinary

Medicine, Conservation and Animal Welfare at the University of Padua, says that "keeping a careful watch of the welfare of the animals involved and balancing these aspects with conservation benefits is crucially important to our mission. Similar to our decision to retire Najin from the program—owing to a misbalance of welfare risks and conservation benefits—we are very certain that for Fatu the combination of highly valuable outcome for the conservation of the species and low risks of adverse health effects for her as an individual animal justify the continuation of the oocyte collections."

Dr. Patrick Omondi, director/CEO, Wildlife Research & Training Institute, says that they "are delighted with the milestones of the project to date. The project demonstrates the success of multi-institutional and multi-disciplinary partnerships and collaborations in saving this iconic species from extinction. The collection of 23 oocytes during the 10th cycle of [oocytes](#) collection and production of five pure northern white rhino embryos from them demonstrates the continued optimization of the field and laboratory procedures."

Brig. (Rtd) J.M. Waweru, director general, Kenya Wildlife Service (KWS), says that they "are delighted as the State Agency in Kenya mandated with the conservation and management of wildlife and its habitats and as partners in the BioRescue consortium to celebrate the achievements made in recovery efforts of the Northern White Rhino's with 22 embryos developed so far. We shall continue to give the required leadership and support to ensure the recovery efforts succeed and to look forward to the 1st northern white rhino calf being born on the Kenyan soil after a long period of uncertainty to revive the hopes of saving the species from imminent extinction."

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