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Cryomicroscopy for Conservation: African Elephant Sperm freezing



In many parts of southern Africa elephant populations are growing to sizes that local habitats cannot sustain. Population methods such as culling have been used, but are currently not supported by a variety of international conservation organizations.

Managing elephant populations through surgical vasectomy is a novel and humane approach, and has recently been established as a practical management tool by the Elephant Population Management Program (EPMP website <http://www.elephantpmp.org>), a team of veterinarians, scientists and wildlife professionals are working to conserve elephants in South African Parks and Reserves. However, vasectomy of breeding bulls results in potential permanent removal of genes from males that are not represented in the population. So at the same time, one goal of this effort is to set up a genome resource bank for African elephants. The importance of genome resource banking is an accepted concept as a repository of genetic material that may act as 'insurance' against catastrophic events.

African elephant semen cryopreservation could also provide significant value in artificial insemination of captive elephants throughout the United States. Artificial insemination is commonly used for breeding, but there are very few elephant bulls in zoological institutions that have viable semen. For this reason, frozen semen from free ranging bulls would be invaluable. Semen collection by electroejaculation immediately before vasectomy combines efforts and ensures that genetic material is saved and stored and not lost to the overall elephant population.

The South-East Zoo Alliance for Reproduction & Conservation (SEZARC) is working with the EPMP to develop a cryopreservation protocol for African elephant semen. An important part of the cryopreservation process is the use of cryomicroscopy to develop optimal freezing protocols. Cryomicroscopy allows rapid analysis of multiple cryodiluents and freezing rates to determine which protocol will be most effective. It also allows determination of critical temperatures during the cooling and warming process, known as membrane phase transitions that can be detrimental to sperm survival. Knowing these critical points allows adjustment of the cooling or thawing rate and/or addition of supplements to help overcome these negative influences.

Written by Dr. Linda Penfold, Director of South-East Zoo Alliance for Reproduction & Conservation.

For more information or to make a donation please see <http://www.sezarc.com>.