Genetic Rescue

Convenors: Oliver Ryder, Dalia Conde and Johanna Staerk

Background: In 2015 at the CBSG meeting in Al-Ain, we had the first GENETIC RESCUE workshop. This year we will follow up focusing on developing a decision framework for which species we need to urgently store live cells. This may depend on many different factors, not only on species threats, population size, but access to samples and possibilities to infrastructure development. We have invited Dr. Melissa A. Kenney to help us developing this framework. Dr. Kenney is an Assistant Research Professor in Environmental Decision Analysis and Indicators at the University of Maryland, Earth System Science Interdisciplinary Center (ESSIC) and Cooperative Institute for Climate and Satellites - Maryland.

Introduction to Genetic Rescue

GENETIC RESCUE is defined as an increase in population-level viability through the re-introduction of previously lost genetic material by cell-based human intervention.

Genetic rescue involves utilizing preserved and banked tissue samples, both reproductive and somatic across a variety of technological means to add genetic diversity and/or producing viable offspring for critically endangered animals and plants. They include artificial insemination, in vitro fertilization, etc., along with induced stem cell development and applications of cloning technology.

Rationale – Genetic Rescue is the response to an extinction crisis. It has the greatest potential for impact where traditional means of species recovery by live animal transfer are not practical or possible. Emerging technologies in genetics and assisted reproduction will be crucial for some species sustainability. Numerous challenges exist in moving from proof of principle to making these technologies practicable. Two examples are methods of species choice for rescue, and another is the lack of availability of suitable samples.

Sources:

Full description of genetic rescue:
Definition from revive and restore
http://reviverestore.org/what-we-do/genetic-rescue/

Genetic rescue and biodiversity banking, Oliver Ryder at TEDxDeExtinction:
http://tedxtalks.ted.com/video/Genetic-rescue-and-biodiversity

The alluring simplicity and complex reality of genetic rescue
http://www.uas.alaska.edu/artssciences/naturalsciences/biology/faculty/tallmon/Tallmonetal_TREE.pdf

2009 Genetic rescue guidelines with examples from Mexican wolves and Florida panthers

2005 TREE Genetic restoration:’ a more comprehensive perspective than ‘genetic rescue
2001 TREE Restoration of genetic variation lost – the genetic rescue hypothesis

Expanding Options for Species Survival: Establishing a Global Wildlife GeneBank of Viable Cell Cultures – presentation by Oliver Ryder