

Helping the Biodiversity Using Conservation Genetic Tools: The Tip of Iceberg

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The anthropogenic action is causing a depletion of the biodiversity in the planet. Pollution, deforestation, exploitation and introduction of exotic species are some examples. Many plants and animal species are suffering the risk of extinction or have been already extinct. Recent studies estimate the existence of eight million species on Earth, of which at least 15,000 are on risk to disappear. In this sense, we are looking at a scenario where the genetic biodiversity has been drastically reduced. Therefore, the survival of our environment is on human hands. A promising option is the use of genetic approaches for conservation maintenance as an alternative to minimize the human action.

The use of genetics to understand and to reduce the risk of populations' extinction is called conservation genetics. The conservation genetics involves the study of factors that causes endangerment and extinction of populations, and genetic management approaches to minimize the inbreeding and maximize the genetic diversity, among small populations. The first book that considered the genetic factor in conservation biology, was written by Otto Frankel and Michael Soulé, 40 years ago. Whereas one of the first concerns was whether inbreeding could have a negative effect in the reproduction and survival of wild species as it was already observed in captivity.

Important issues that conservation genetics deals with are the effect of inbreeding, in the loss of genetic diversity and mutational accumulation. The inbreeding is defined as the cross of related individuals to produce an offspring. These issues are generally related with small populations with reduced gene flow. The inbreeding process will increase the levels of homozygosity and might lead

the occurrence of harmful recessive alleles reducing the animal fitness.

Therefore, understating the genetic composition and their environment interaction will help to better select animals to improve the gene flow whitening populations as a tool to minimize the inbreeding effects specially in wild populations. In addition to that the study of molecular, quantitative and population genetics for conservation provides a rich source of information. Furthermore, investigations of population structures will unveil what happened with populations in the past and will help for future decisions, specially selecting the better sites for animal reintroduction.

Although several efforts have been implemented to minimize the extinction rate of populations, it is clear that we will require a greater human intervention to maintain the current species for the future, and the conservation genetics is the key factor for the maintenance of the biodiversity in conservation programs.

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