

'Frozen Ark' collects animal DNA in face of mass extinction

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A depiction of the double helical structure of DNA. Its four coding units (A, T, C, G) are color-coded in pink, orange, purple and yellow. Credit: NHGRI

A British-led project called "Frozen Ark" is preserving the DNA of endangered species before they disappear as the Earth undergoes what scientists are calling the sixth mass extinction.

"Many of these species are going to go extinct before we even know they exist," said John Armour, Professor of Human Genetics at the University of Nottingham, which is host to the project.

"The whole idea of the Frozen Ark is to get and preserve that material for [future generations](#) before it's too late."

Launched a little over a decade ago by British scientists Bryan Clarke, who died last year, and his wife Ann, the Frozen Ark network now has 22 partners worldwide.

In all 48,000 samples have been collected belonging to some 5,500 species.

In Nottingham, some of the 705 samples are on special cards to keep DNA at room temperature and others are in a freezer at -80 degrees Celsius (-111 Fahrenheit), including samples of a Siberian tiger and an Amur leopard.

Many conservationists see the project as defeatist, said Professor Ed Louis, a trustee of the Frozen Ark.

"Their attitude is that we should be putting every effort into saving the [endangered species](#). The fact is that it's impractical and impossible," Louis explained.

"We're not there to replace the efforts to save, it's a backup. It can hopefully save the genetic heritage of just about everything."

If the invertebrates die, we die

It was the extinction in the wild of a small snail unique to Tahiti, the Partula, which was destroyed by the introduction of a carnivorous snail intended to eradicate another invasive mollusks, that inspired Bryan Clarke to begin the modern-day Noah's Ark.

By collecting Partula snails in his laboratory and sending them to several zoos around the world, Clarke was able to preserve some of the species. A re-introduction is now being tested.

"We looked at each other one day and thought people must be doing this for other endangered species," Frozen Ark co-founder Ann Clarke recalls.

"But there was nothing for the whole fauna, and particularly not for the invertebrates, which are very important even if not as charismatic as the vertebrates."

"Everything depends on the invertebrates. If the invertebrates go down, we're going down too," Clarke added.

So many species are in such rapid decline that scientists say that the earth's sixth great extinction is under way. The last, that killed off the dinosaurs, occurred 65 million years ago.

The book "The Sixth Extinction" by journalist Elizabeth Kolbert sets out how the die-off has been caused by human activity and climate change, with life in the oceans particularly affected.

The book was on US President Barack Obama's list of holiday reading this year.

The predictions are frightening: coral reefs, home to over a quarter of all marine species, could disappear by 2050.

About 41 percent of amphibians and 26 of mammal [species](#) are threatened with extinction, according to the International Union for Conservation of Nature.

Bringing back the extinct

But what is the use of stored DNA and cells? The material can provide a wealth of information, according to the scientists.

"We are in an age where antibiotics are soon not going to work," explained Professor Louis.

"Amphibian skin is covered with small molecules that kill off bacteria. A solution to an age where antibiotics no longer work could come from altering the molecules that come from that."

But the project could go further.

"The most extreme positive use of it would be de-extinction, where you would use that material as the basis to recreate the organism from its genetic information," said Armour.

But for now, the idea is out of reach.

"Some people say 'you're playing God' and I always answer that this is for future generations to decide what to do with it when the techniques are available," said Ann Clarke.

"If you don't get it stored, there will be no choice."

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