BIOTECH

The coelacanth and biotechnology

Biotechnology plays a big role in the study of the coelacanth. All the information which coelacanths inherit from one generation to another is stored in their DNA as genes. Biotechnology is the tool to measure all these genetic differences of the coelacanth DNA.

The more genetic differences there are, the better, as it means the coelacanth is more likely to survive changing conditions and new diseases. If there is little genetic variation, the coelacanth could possibly be wiped out by a new disease as it is less likely to have the gene needed to fight the disease.

Studying the genetics of coelacanth populations will answer many of our questions regarding this fascinating fish. It will tell us if the South African population is unique or similar to those found in other parts of the world; if the individuals in South Africa are all members of one family; and if the population is large enough to breed and survive.

Members of the research team are collecting scales from coelacanths without disturbing or harming them. Scales grow back rapidly to replace those that had been removed. Scale samples have been collected from six individuals to date to study the genetics of the coelacanth. The scales have so far shown that the South African group is closely related to populations elsewhere off Africa.

Four-limbed animals

The coelacanth is very important to biologists studying the evolution of four-limbed animals (tetrapods). Learning more about the genome (sets of chromosomes containing genes) structure and biology of the coelacanth will tell scientists lots about the evolution of modern day vertebrates. The coelacanth genome may offer a glimpse of the genomes of creatures that evolved into modern day tetrapods over 400 million years ago.

Sources: African Coelacanth Ecosystem Programme; Public Understanding of Biotechnology Programme

A coelacanth fossil

Biodiversity and the health of planet Earth

We need biodiversity (many different forms of life) on Earth if we want to continue to live here. Biodiversity shows how sick or healthy our planet is.

There are three types of diversity that indicate our planet's health:

- **Ecosystem diversity:**
  The variety of environments on Earth, made up of different habitats. The Greater St Lucia Wetland Park is an example of a habitat.
- **Differences between species:**
  A species is a particular kind of organism. There are about one million known animal species and over 350 000 known plant species. All members of a species have the same general appearance and behaviour. The coelacanth is an example of a species. The members of a species breed among themselves and, because the same mixture of chromosomes and genes is passed to the new generation, the offspring are of the same kind.
- **Differences within species:**
  In a species, there can be lots of variation between individuals' genetics. If you look at your friends, they are all slightly different though they are all members of the human species. Coelacanths will all also differ from one another.

EASY SCIENCE