

The coelacanth leads a monogamous life

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Latimeria menadoensis, Tokyo Sea Life Park (Kasai Rinkai Suizokuen), Japan.
Credit: OpenCage / Wikipedia.

Scientists have successfully analyzed the genetic make-up of the offspring of pregnant coelacanth females for the first time. They found that the likelihood that the offspring is fathered by one single individual is very high – unlike with many other fish species.

Dr Kathrin Lampert from the Ruhr-Universität Bochum and Prof Dr Manfred Schartl from the University of Würzburg, together with their colleagues, report about their findings in the journal *Nature Communications*.

Analysis of the microsatellite DNA

The pregnant [coelacanth females](#) studied by the researchers were about to give birth to their offspring. One female that had accidentally ended up in a trawl net by the Mozambique coast was carrying 26 embryos, another one caught unintentionally by fishermen in Zanzibar waters was carrying 23. When comparing 14 characteristic spots in the genetic make-up of the females and of their offspring with each other, the researchers found numerous overlaps. They deployed a method that is also utilised for conducting paternity tests in humans, namely microsatellite analysis. Microsatellites are short DNA sequences, consisting of only a few units that, typically, may recur up to 50 times. They do not usually carry any [genetic information](#), but they are passed down from both parents. "As we know the mother's genotype, we are able to demonstrate by means of the microsatellite analysis that coelacanth offspring have one single father," says Manfred Schartl. Consequently, coelacanth females must be monogamous – at least for a certain period of time. The team also reconstructed the "hypothetical genotype", i.e. the hypothetical genetic make-up of both fathers.

Coelacanths do not take advantage of multiple mating

It is not clear why the females mate with one single male each. Mating with several males increases the chance of successful fertilisation, results in a higher [genetic variability](#) in the offspring and ensures that the best [genes](#) are passed on. It is possible that the advantages of multiple mating do not outweigh the costs for the female: increased energy input when searching for new males, danger of falling prey to predators, and an increased risk of infection.

No mating with relatives

The researchers discovered another interesting detail in the coelacanth's genetic make-up: father and mother of the offspring were not more closely related than the majority of random couples in a coelacanth population. This could mean that the females avoid mating with close relatives. Or that other features are more relevant in the choice for a suitable mate, for example size and frame or resistance against parasites.

Three years of pregnancy

In many [fish species](#), fertilisation takes place outside the body. The females lay their eggs in a quiet spot in their aquatic environment; subsequently, the males – it can be several – add their semen. The [offspring](#) grow up in the water without their parents' protection – whereas the coelacanth gives birth to fully developed young. Scientists estimate that the "pregnancy" takes about three years.

Coelacanths were thought to be extinct

Until December 23, 1938, scientists had been convinced that coelacanths were extinct. Only a few fossilised prints gave evidence that those animals had existed more than 300 million years ago. Then, fishermen by the South-African coast discovered a greyish blue fish with a length

of some 1.50 m and a weight of some 52 kg in their trawl net: the first specimen of a living coelacanth. Today, the existence of some 300 specimen has been proved. It is very difficult to get hold of tissue samples of a complete litter of a pregnant coelacanth female. This was made possible by the co-authors of "GEOMAR" in Kiel and Tutzing who have been researching the coelacanths' habits and occurrence for many years.

More information: Lampert, K. et al. (2013): Single male paternity in coelacanths, *Nature Communications*. [DOI: 10.1038/ncomms3488](https://doi.org/10.1038/ncomms3488)

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