

I discovered why seemingly healthy amphibians were being wiped out

The mass deaths were puzzling scientists around the world – there were no signs of viruses or parasites. Then we looked closely at their skin

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‘We must find a way to live in balance with species’: Andrew Cunningham at work at the Zoological Society of London. Photograph: David Levene/The Guardian

I

It was while we were sitting and talking in a hotel bar at the first global congress of herpetology that the world's amphibian experts realised there was a problem: frogs, toads, salamanders and newts were disappearing in their thousands around the world and nobody understood why.

Not a single talk at the 1989 congress at the University of Kent had discussed the strange disappearance of the world's amphibians. But scientist after scientist had the same story: from Central America to Australia, they were vanishing.



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The year before, I had joined the Zoological Society of London as a veterinary pathologist. It was my job to work out why animals had died. Shortly after I started, members of the public began calling up London Zoo with news that dozens of frogs had died in their garden without explanation. More and more of these reports started to come in. I started testing the dead frogs to find out what was going on as part of a PhD, and found a ranavirus had been spreading through frogs in England.

Although it was already known in the US, this was the first time a ranavirus had been found to be killing wild frogs in Europe. I presented my findings, which led to an invitation to Australia to help with a new mystery. A master's student was looking into a string of unexplained amphibian deaths in a Queensland rainforest.



In the late 1980s, reports started coming in from the public of frogs dying in British gardens. Photograph: Graham Turner/The Guardian

The animals that were dying there appeared healthy: the tissues were intact, there were no parasites and they had been tested for viruses and bacteria. Nothing. They were just dead.



I discovered a tiny frog that lives its whole life inside one plant

But while reviewing the evidence, I realised I had seen this before. On a visit to Melbourne Zoo a couple of years earlier, I had been shown some tadpoles of a species of frog in Queensland that was at risk of extinction. They thrived as tadpoles but died after turning into frogs. All of the pathology reports had found the frogs to be healthy – apart from no longer being alive – but for the presence of an unknown organism in the skin.

Almost 100 amphibian species have disappeared in the past 50 years and hundreds have declined in number

With the master's student, I looked at the skin of the frogs we had been examining from the Queensland rainforests. Under a microscope, they had the same strange organisms that I had read about in the pathology reports at Melbourne Zoo. So we set up an experiment. We exposed a small number of healthy frogs to the infected skin. They all died – and they all had the organism growing in their skin.



Cunningham set up experiments to see how healthy frogs reacted when exposed to the unknown organism. Photograph: David Levene/The Guardian

At the same time, I knew colleagues in Panama were looking into the same problem. I told them to look at the skin of their dead frogs to see if they had the same infection. They did. We put our results together and in 1998 we published them, and announced to the world that a fungus – later called *Batrachochytrium dendrobatidis* – was infecting and killing amphibians

globally. It attacked their skin, causing the frogs to have a sudden heart attack and die.

Other researchers have since verified our results and gone on to find multiple strains of the fungus. The most deadly strain appears to only be about 100 years old, probably transported around the world by humans, and it continues to wipe out amphibians.

So far, almost 100 amphibian species are known to have disappeared in the past 50 years and hundreds have declined in number. One affected species I am studying is the mountain chicken frog – once common in the Caribbean – which is down to the final 30 individuals known about in the wild. I may outlive it. To me, this disease is a reminder of the destructive impact humanity can have on the planet and its biodiversity. This disease probably would not exist without us. We must find a way to live in balance with the wonderful species with which we share the Earth.