Panama's frog decline

Alarm bells have been ringing about amphibian species around the world in recent years as populations appear to be in serious decline. The fungal pathogen *Batrachochytrium dendrobatidis* has been seen as a major cause. But there has been a lack of population data before and after the outbreak of the pathogen, so the results of a new study, providing such data, are the more alarming.

Andrew Crawford at the Smithsonian Tropical Research Institute in Panama, and colleagues in Panama, Colombia and Maryland, report in the *Proceedings of the National Academy of Sciences* (published online) a study of amphibians in the highlands of central Panama. The team were able to compare their results with surveys carried out in 2000–2003 before the fungus outbreak.

They describe how knowledge of amphibian species diversity is far from complete. "Increased exploration in the tropics and new molecular approaches to the identification of cryptic amphibian lineages are leading to a rapid description of new species," they write.

Crawford and his colleagues describe an analysis of frog species in El Cope, Panama. "We discovered that 30 species were lost, including five undescribed species, representing 41 per cent of total amphibian lineage diversity in El Cope.

The irony of increased species discovery coupled with enigmatic population declines in amphibians was recognised at least 10 years ago, "yet until now we have lacked quantitative data demonstrating the direct impact of epidemic disease on amphibian diversity and community phylogeny. Combining changes in species-specific abundance with DNA barcode identities permitted us to quantify the loss of individuals, lineages, and evolutionary history resulting from Chytridiomycosis," they write. The disease has caused the loss of 25 species, 11 genera, and 4 families from El Cope, they believe.

"Molecular data increased the number of extirpations recorded at El Cope by 20 per cent. Given that El Cope is one of the better-studied amphibian faunas in the Neotropics, the loss of undescribed species is likely far greater in sites that have not been the object of intensive investigation."

Nigel Williams

Precious: The Panama golden frog, a symbol of the country, is one of the species in serious decline according to a new study. (Photo: Andrew Crawford.)

Q & A

Elizabeth C. Raff

Beth Raff grew up near Washington, D.C.; she got a B.S. in biochemistry from Penn State, and a Ph.D. in biochemistry from Duke. Following several postdocs, one stay-at-home-mother year, and some years as a research scientist, for the past 24 years she has been on the faculty of the Indiana University Department of Biology, where she is currently Professor of Biology. From 2002–2007, she was the first woman chair of Biology, during which time she had the immense satisfaction of hiring a third of the current 61 members of the department. She is married to evolutionary biologist Rudy Raff; they have two children and one grandchild.

How did you get interested in science? Some people are more or less 'born scientists', biologists often starting as kid naturalists; others come to science through a later intellectual interest. I fall into the latter category, with a little flavoring from the first. Through most of my K-12 school career, I intended to be something 'literary', but in the end I was strongly influenced by my wonderful high school chemistry teacher, who held Saturday labs where we could do all kinds of — I now realise — not entirely safe chemistry experiments. I started college as a chemistry major, then switched to biochemistry when I hit upper-level analytical chemistry (too many decimal places). I loved biochemistry; it felt as natural to me as earlier organic chemistry had. But at first it was frustrating. When I walked into class a couple of days late after changing my major, the professor was talking about fascinating reactions, but it took me several days to figure out exactly *where* these reactions were happening — strangely, neither the professor nor the textbook mentioned cells.

I have only ever taken two biology courses — one in high school, and the entry level course at Penn State, which I took in a class of thousands by remote access TV hook-up and remember only for the professor