

COSMOS ⁺₊⁺



News

Origin of frog-killing fungus probed

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Cosmos Online

Tuesday, 7 August 2007



Staying power: Frog populations in California and worldwide are being wiped out by the chytrid fungus. Research now suggests the fungus can reproduce sexually meaning it is even more hardy and persistent than realised.

Image: Vrandenburg/Morgan



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SYDNEY: A new study is providing vital clues to the origin of a deadly disease ripping through global frog populations – it

also suggests the chytrid fungus is much hardier than thought.

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The research helps to confirm that the disease is a newly spread pathogen, rather than an existing one that has become more dangerous with climate change.

The frog killing chytrid fungus, *Batrachochytrium dendrobatidis*, infects the skin of susceptible amphibians and rapidly kills them. Not identified until 1998, the waterborne pathogen has already been fingered in the extinction of more than 150 species. It is known to have penetrated remote locales, national parks and protected preserves, and is taking a heavy toll on frogs on nearly every continent.

Question marks

However, there is still much that experts have to learn about the disease - such as how it is able to spread so quickly and how it kills its victims. Though recent studies have discovered the fungus on African museum specimens dating back to the 1930s, we still understand very little about its origins.

Now, experts led by Jess Morgan – of both the University of California in Berkeley U.S. and the Department of Primary Industries and Fisheries in Queensland, Australia – have tested two competing theories to uncover more about the chytrid's origins.

One is that the fungus is a new pathogen that has rapidly spread around the world, the other is that it was an existing pathogen in many places, but that environmental changes, particularly global warming, have allowed it to become more virulent.

The scientists tagged and tracked populations of two sister species of mountain yellow-legged frogs, endemic to the mountains of California, *Rana muscosa* and *Rana sierrae*. They then collected 100 samples of chytrid fungus from across the region and analysed its DNA.

They report their results today in the U.S. journal, the *Proceedings of the National Academy of Sciences*.

Over the two-year period of observation the experts found that the fungus rapidly wiped out entire populations of the frogs; which showed little immunity to the pathogen. They also found that, though the two species of frogs are totally isolated by a mountain range, the DNA of the fungus extracted from both populations was in some ways very similar.

Together these finds suggest that the fungus is a new pathogen, write the authors, as if it was pre-existing in the populations, then some limited immunity should have been observed. Furthermore if the pathogen had been present for some time it might have evolved more diversity between the two isolated populations of frogs, they said.

Sexual behaviour

The team also made a second surprising discovery during their DNA analysis: some unexpected kinds of genetic diversity between the fungal isolates reveals that the chytrid fungus is reproducing sexually - rather than asexually by cloning itself as had been assumed by experts.

The find is significant as it means the fungus is a hardy more persistent species that can survive outside its host and evolve more rapidly than asexual fungi through shuffling its genes.

"Persistence of the fungus would complicate efforts to reintroduce amphibians" to sites where the fungus had eradicated them, said Morgan. The discovery "underscores how little we know about the it"

Though the current study will help build a model of the fungus in order to control it, Ross Alford, biologist at James Cook University in Townsville, Queensland, agrees that the picture is far from complete. "There is clearly a great deal more to

learn before we really understand the origins of this threat to amphibian diversity and can develop approaches to controlling or reducing it."

Alford added that the genetic analysis of the fungus and the discovery of its sexual mode of reproduction is a major breakthrough.

Readers' comments

Ecellent, well-written

Ecellent, well-written story.
-Benwah

Submitted by Visitor on 10 August 2007 - 4:48am.

Uses for the fungus

I was wondering if the fungus might provide a way of eradicating cane toads ?

Submitted by Peter on 13 August 2007 - 9:25am.

Frog killing fungus

Last year we had heaps of Peron's tree frogs around our house, we even bred about 700 of them in a pond for the kids to experience. So far we have not seen a single frog this year, even with these hot days they have failed to come out. Seems they might have been wiped out by the fungus.

Submitted by Visitor on 3 October 2007 - 11:27pm.

Frogs

i hope something can be done about this it really is sad to see this happening.

Submitted by Visitor on 19 February 2008 - 4:44pm.

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