

Fatal fungus in frogs may be key to saving humans in the future

May 12 2010, By Mark Grossi

Scientists have been alarmed for years about a mysterious fungus that wipes out frogs around the globe -- even in wildlife sanctuaries like Yosemite and Sequoia-Kings Canyon national parks.

The [fungus](#) blitzes [frog populations](#), allowing little chance for natural defenses to protect the amphibians, new research shows. Now scientists wonder if some new plague might do the same thing to humans.

"The thought of it makes the hair stand up on the back of my neck," said biologist Vance T. Vredenburg of San Francisco State University. "Emerging diseases for humans are cropping up much faster than before, and they might move like this one. We need to understand this."

Vredenburg and three other researchers have just finished two studies on the frog disease, called chytrid fungus, based on years of work in Yosemite and Sequoia-Kings Canyon. The studies will appear this week in the [Proceedings of the National Academy of Sciences](#), a research journal established in 1914.

The frog studies are part of the scientific community's push to better understand the broad die-off of amphibians around the world. Some experts believe it is part of a [mass extinction](#) of many animals.

More than 40 percent of the 6,500 known amphibian species have disappeared in the last few years, and chytrid fungus is only one cause. Pollution, pesticides, predatory fish, habitat loss and ultraviolet radiation

also are involved. But the fungus may be the least understood.

Vredenburg said there may be ways to protect the [frogs](#) from the fungus, perhaps by removing as many as possible when the disease appears.

Scientists couldn't move fast enough in Sequoia-Kings Canyon, where nearly 5,600 male mountain yellow-legged frogs had been reduced in just a few seasons to fewer than 500 by 2008 at Barrett Lakes Basin. There were similar dramatic die-offs at Milestone and Sixty Lake basins in Sequoia-Kings Canyon.

But the news isn't all bad. Vredenburg said some species, such as tree frogs, did not suffer die-offs even though they were exposed to the fungus.

Another glimmer of hope: Though the disease killed most mountain yellow-legged frogs when it entered Yosemite years ago, some small groups have survived.

That could mean the disease moves more slowly after the frog populations have thinned out, said Ecologist Cheryl J. Briggs of the University of California at Santa Barbara. Maybe nature will be able to cope with this disease.

"I'm slightly more optimistic for the future," said Briggs, who was the lead author on one of the studies. "But what does rapid removal of so many frogs do to the rest of the aquatic community? That's a good question. We don't have an answer yet."

The 2- to 3-inch mountain yellow-legged frog can live more than 15 years in isolated streams and mountain lakes. At high elevation, it doesn't change from tadpole to frog in a single season, instead spending three or four winters under the ice in a lake.

In the Sierra, more than 90 percent of mountain yellow-legged frogs have disappeared over the last century. Losses have accelerated over the last decade as chytrid fungus has spread. Scientists do not know the origins of the disease.

Vredenburg said up to three-quarters of new human diseases these days are coming from animals, such as swine flu. He said that people could benefit as much as the frogs if researchers can learn ways to slow down diseases that move so quickly.

In Panama, for instance, scientists have removed frogs in areas where the disease is spreading. The frogs will be returned to the wild when the outbreak subsides.

In Sequoia-Kings, researchers next year will capture and treat infected frogs and tadpoles at individual lakes. An antifungal drug, something like the medication for athlete's foot, will be used.

Such treatments have proven successful with frogs, and scientists use gloves and sterile techniques to prevent the unintentional spread of the fungus.

Researchers also might try to grow beneficial bacteria on the skin of the frogs. The bacteria has killed the fungus in laboratory tests.

"We're not trying to get rid of the pathogen in nature," Vredenburg said. "The idea is to give these animals a chance to react with an immune response."

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