

# Deadly frog fungus dates back to 1880s, studies find

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The *Anaxyrus americanus* frog was one of several species from Illinois for which specimens were tested for Bd. Credit: Brooke Talley

A deadly fungus responsible for the extinction of more than 200 amphibian species worldwide has coexisted harmlessly with animals in Illinois and Korea for more than a century, a pair of studies have found.

Amphibians in Illinois have been coexisting with the fungus *Batrachochytrium dendrobatidis*, or Bd, for at least 126 years without [adverse effects](#) seen in other parts of the world such as mass-die offs, according to research published Jan. 13 in the journal *Biological Conservation*. In a study published March 4 in *PLOS ONE*, researchers were able to date the fungus in Korea back to 1911. The results will help scientists better understand the [disease](#) caused by Bd, chytridiomycosis, and the conditions under which it can be survived.

"Part of understanding a disease is understanding the dynamics of the host and pathogen," said Vance Vredenburg, an associate professor of biology at San Francisco State University and co-author of the studies, who has been researching Bd for more than a decade. "What we have now is a benchmark where the dynamics have been stable for well over 100 years."

Before the new study, the earliest confirmed instance of Bd was in Brazil during the 1890s. The discovery in Illinois also dates back 50 years earlier than previous instances for North America.

Chytridiomycosis, or chytrid, has driven more than 200 [amphibian species](#) worldwide to extinction and poses the greatest threat to vertebrate biodiversity of any known disease. Vredenburg has tracked the spread of the disease since 2003 in such places as the Sierra Nevada and Andes mountains, including identifying such common carriers as the African clawed frog, the American bullfrog and Pacific chorus frog. Human transportation of these animals is one way to explain how Bd—and the resulting disease chytridiomycosis—is introduced to new populations, sparking mass die-offs.



A *Rugosa emeljanovi* frog is shown. Three specimens of this species, collected in 1911 from Wonsan, North Korea, tested positive for Bd. Credit: Jon Fong

"This fungus has been emerging all over the world and causing major, major problems," Vredenburg said. "Taking the information we now have from this research, we can look at the animals in Illinois and Korea, figure out how they are surviving and translate that knowledge to other parts of the world where we see massive declines of [amphibian populations](#)."

One key difference in the two studies is that, while testing showed that Bd was widespread in Illinois dating back to the 1880s, the disease was far less common in Korea during the 1900s than it is today. That, Vredenburg said, indicates that the behavior of the fungus differs depending on location, a key piece of information for biologists to keep in mind when studying its spread.

The study also validates the effectiveness of testing for Bd in [museum specimens](#), which a graduate student, Tina Cheng, pioneered at SF State. Some of the museum specimens are more than 100 years old, prompting concerns that older DNA may have degraded, leading to "false

negatives," but Vredenburg and his colleagues found the fungus on some of the oldest samples available. During the two studies, researchers tested more than 1,200 amphibian samples collected between 1888 and 2004.

The next step, Vredenburg said, is to pinpoint which attributes allow Illinois-area and Korean amphibians to co-exist with the [fungus](#) so that biologists can use that information in their efforts to study this disease in other parts of the globe and prevent further extinctions.

**More information:** "A century of *Batrachochytrium dendrobatidis* in Illinois amphibians (1888-1989)" by Brooke L. Talley, Carly R. Muletz, Vance T. Vredenburg, Robert C. Fleischer and Karin R. Lips was published online Jan. 13 in *Biological Conservation*.

"Early 1990s Detection of *Batrachochytrium dendrobatidis* in Korean Amphibians" by Jonathan J. Fong, Tina L. Cheng, Arnaud Batille, Allan P. Pessier, Bruce Waldman and Vance T. Vredenburg was published March 4 in *PLOS ONE*.

Provided by San Francisco State University

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