Lethal pathogen causes widespread biological disruption for frogs, but responses differ by species

January 17 2023

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A new study by a Western Sydney University researcher has explored a lethal fungal pathogen causing widespread biological disruption for

frogs, assessing how responses differ by species across the globe.

Published in *Functional Ecology*, the study looked at the chytrid fungus pathogen which is considered the most devastating single disease on biodiversity, contributing to the decline of at least 501 amphibian species.

Lead author Dr. Nicholas Wu, from the University's Hawkesbury Institute for the Environment, said the largest biodiversity decline caused by a single disease is chytridiomycosis, however, it is not known whether frogs infected with this fungus experience the same symptoms.

"Using a meta-analytic approach, the study revealed there are several commonalities in symptoms among frog species that provide a clearer idea of the mechanism of the disease, and therefore death," said Dr. Wu.

"These common symptoms can be used in conservation practices to predict how frogs who have not been exposed may respond to chytrid infection. For example, by swabbing a sick frog in the wild and knowing the pathogen load, we can predict what the animal might be experiencing without experimentally testing it directly.

"The findings suggest that if the pathogen load is low, the host may experience skin disruption only and changes in immune response, but at a high pathogen load, they will experience changes in reproduction and body condition."

With the growing number of emerging infectious diseases, meta-analytic approaches can be a useful tool to better understanding disease dynamics in an ecological context Dr. Wu explained.

"Emerging infectious diseases have contributed to the ongoing loss of biodiversity worldwide. How species respond to infectious pathogens

depends on a myriad of environmental factors, as well as differences in the host and pathogen traits," he said.

"Different 'traits' related to an animal's fitness such as body condition, reproduction or metabolic rate may be more sensitive to pathogen load, and understanding similarities in trait sensitivity can help understand disease impact and help wildlife management efforts."

More information: Nicholas C. Wu, Pathogen load predicts host functional disruption: A meta-analysis of an amphibian fungal panzootic, *Functional Ecology* (2023). DOI: 10.1111/1365-2435.14245

Provided by Western Sydney University