

Probiotic bacteria protect endangered frogs from lethal skin disease

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Laboratory tests and field studies conducted by James Madison University (JMU) researchers continue to show promise that probiotic bacteria can be used to help amphibian populations, including the endangered yellow-legged frog, fend off lethal skin diseases.

The latest research, funded by the National Science Foundation, will be presented June 4 by undergraduate biology major Brianna Lam at the 108th General Meeting of the American Society for Microbiology in Boston. Other coauthors of the presentation are Drs. Doug Woodhams and Reid Harris from James Madison University and Vance Vredenburg from San Francisco State University (SFSU).

A year ago, JMU research showed that *Pedobacter cryoconitis*, a natural bacterial species on the skin of red-backed salamanders, wards off the deadly chytridiomycosis fungus. In late 2004, Australian researchers cited chytridiomycosis as one of the main factors imperiling up to one third of the world's amphibian populations.

Lam's research indicates that adding pedobacter to the skin of mountain yellow-legged frogs would lessen the effects of *Batrachochytrium dendrobatidis* (Bd), a lethal skin pathogen that is threatening remaining populations of the frogs in their native Sierra Nevada habitats.

Lam first conducted petri dish experiments that clearly showed the skin bacteria repelling the deadly fungus. She then tested pedobacter on live infected frogs, bathing some of them in a pedobacter solution. The frogs

bathed in pedobacter solution lost less weight than those in a control group of infected frogs that were not inoculated.

In addition to the lab experiments, the JMU and SFSU researchers have studied the yellow-legged frogs in their natural habitats and discovered that some populations with the lethal skin disease survive while others go extinct. The populations that survived had significantly higher proportions of individuals with anti-Bd bacteria. The results strongly suggest that a threshold frequency of individuals need to have anti-Bd bacteria to allow a population to persist with Bd.

“Taken together, the studies suggest that increasing the proportion of individuals with anti-Bd skin bacteria in at risk populations can halt the epidemic spread of the lethal pathogen,” says Lam.

Source: American Society for Microbiology

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