Sunbathing not good for tadpoles

February 17 2011

(PhysOrg.com) -- The thinning ozone layer in the upper atmosphere may be a key factor in the collapse of frog populations worldwide, new research shows.

Tadpoles exposed to higher levels of UV-B sunlight are more susceptible to predators, a University of Queensland study found.

The research by PhD student Lesley Alton is reported this month in Proceedings of the Royal Society B.

Amphibians – including frogs, toads and salamanders – are facing an extinction crisis worldwide.

Almost one in three species is threatened, with factors including the loss and fragmentation of habitat, disease, pollution, climate change and introduced predators.

At least 150 species have disappeared since 1980, compared with a natural extinction rate of about one species every 250 years.

The UQ researchers looked particularly at the interactive effects of UV-B and predation risk in the early-life stages of the striped marsh frog.

Ms Alton, from UQ's School of Biological Sciences, said ozone depletion in the past 40 years had increased UV-B radiation. Her work studied the effects on tadpoles of a five per cent rise in UV-B.

“Embryos exposed to the lower UV-B treatment hatched as well as those exposed to the higher UV-B treatment,” Ms Alton said. “These tadpoles were also the same size and shape, and were able to swim just as fast.”

But the survival time of tadpoles exposed to the higher UV-B treatment fell by nearly 30 per cent when they were exposed to predatory shrimp.

“This finding is significant because it shows that for tadpoles living with predators exposure to elevated UV-B levels can have lethal consequences,” Ms Alton said.

“Given that the detrimental effects of UV-B radiation were only evident in predation trials, this study also demonstrates the importance of examining the effects of UV-B radiation in an ecologically relevant context, because otherwise the significance of UV-B radiation as an environmental stressor may be misinterpreted.

“The phenomenon of global amphibian declines is a testament to the profound effects of human-induced global change on natural environments.

“With amphibians being the most threatened of all vertebrates, and also important indicators of environmental health, understanding the causes of their declines is critical for their conservation, and possibly the conservation of other species.

“Our study suggests that the human destruction of the ozone layer has the potential be an important contributor to the global decline in amphibian populations.”

More information: rspb.royalsocietypublishing.org/

Provided by University of Queensland