

Small predator diversity is an important part of a healthy ecosystem

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Biodiversity, including small predators such as dragonflies and other aquatic bugs that attack and consume parasites, may improve the health of amphibians, according to a team of researchers. Amphibians have experienced marked declines in the wild around the world in recent decades, the team added.

The study suggests that dwindling global environmental biodiversity and worldwide spikes in infectious diseases may be linked, said Jason Rohr, associate professor of integrative biology, University of Southern Florida.

"In the last century, there has been an unprecedented global increase in [infectious diseases](#) and a concomitant decline in and homogenization of biodiversity," said Rohr. "The controversial 'dilution effect hypothesis' suggests that the two phenomena might be linked, or that biodiversity often decreases disease risk."

In the study, which included a series of laboratory experiments, field surveys and mathematical modeling, the presence of various species of dragonfly larvae reduced the infections in frogs caused by parasitic flatworms called trematodes, said Val Beasley, professor and head of the department of veterinary and biomedical sciences, Penn State, who worked with Rohr and whose research group collaborated with Lucinda Johnson, senior research associate and director of the Center for Water and the Environment, University of Minnesota Duluth, to complete the field study.

Beasley said that various species of trematodes penetrate tadpoles, sometimes killing them and at other times weakening them with tissue damage, kidney failure, or severe limb deformities when the tadpoles develop into frogs. He added that other vertebrate species commonly catch trematode infections from bodies of water. These include wildlife, domestic animals and humans—mostly children—who are commonly affected by schistosomiasis in tropical parts of the world.

The researchers, who release their findings today (Feb. 23) in the *Proceedings of the National Academy of Sciences*, did not see a similar reduction in trematode infections in the presence of larval damselflies, which are intraguild [predators](#), meaning they attacked and killed not only the parasites but also the tadpole hosts.

According to Rohr, most research on biodiversity focuses on the diversity of parasite hosts, while this study reveals the importance of the diversity of species that attack and eat parasites.

"In our wetland survey, our microcosms and disease models, we discovered that there were fewer flatworms in frogs where there were more species of flatworm predators," said Rohr. "Additionally, the field study indicated that the diversity of these predators was a better predictor of flatworm infections than nutrients, frog immunity or the diversity and abundance of hosts."

The researchers emphasized the similarities between their findings and research on roles of small predator communities that help control crop pests. They concluded that both management of [crop pests](#) and efforts to prevent parasitic disease can be guided by the need to conserve the [biodiversity](#) of small predators.

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