

Adaptation is (not) in the eye of the beholder

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The limited immune response in the eyes of freshwater fishes has created a great home for parasites, according to research published online in the journal *Molecular Ecology*. The study provides a lens into the evolutionary world of the larval flukes that parasitize Canadian fish.

"Canada probably has the best studied freshwater [fish](#) parasites in the world, so we were amazed when we found four times more species of flukes in a few fishes from the St. Lawrence than were previously known in all fishes across the whole country," says Sean Locke, who recently obtained his PhD from Concordia University in Montreal, Quebec.

The larval flukes that infect freshwater fish mostly appear as microscopic, indistinct white blobs that are nearly impossible to identify. As a result, biologists have long had only a vague idea about how many fish-dwelling parasite species exist.

The prevailing view has been that only a small number of generalist species infect all sorts of different fish. But Locke and his colleagues used DNA barcoding to show for the first time that this was not the case. The parasites found in most tissues—including muscle, gills, brains and internal organs—specialized on one or a few closely related fishes, the researchers found. In contrast, the lenses of fish eyes were home to five species of non-specialized flukes that thrived in many different fish species and even frogs.

"The lens seems to be the host's Achilles' heel," says Locke. "An

[immune response](#) there would blind the fish, so it appears evolution has favoured immunological restraint. The parasites there haven't needed to specialize in dealing with any one host's immune response and hence the same parasite species appear in all sorts of different fish."

The findings may have practical benefits for wildlife managers and fish farmers. Larval flukes are among the most common fish parasites in the world and cause problems in aquaculture and sport fisheries.

"Getting rid of wildlife [parasites](#) is very difficult even when you know what you're dealing with," notes Locke. "But identifying a pathogen is the first step to controlling it."

More information: Locke.SA, Mclaughlin. D, Marcogliese, "DNA barcodes show cryptic diversity and a potential physiological basis for host specificity among Diplostomoidea (Platyhelminthes: Digenea) parasitizing freshwater fishes in the St. Lawrence River, Canada (p) " Molecular Ecology, Wiley-Blackwell, June 2009 [DOI: 10.1111/j.1365-294X.2010.04713.x](#)

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