

Warmer, faster, stronger: Research reveals unexpected benefits of living in a changing climate

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McMaster biologist Graham Scott looks at a zebrafish. Scott has found that that growing up at warmer temperatures helps some aquatic animals cope with

climate change, raising questions about the limits of adaptation. Photo: JD Howell

(Phys.org) -- New research by McMaster biologist Graham Scott suggests that growing up at warmer temperatures helps some aquatic animals cope with climate change, raising questions about the limits of adaptation.

Working with Ian Johnston at the University of St Andrews in Scotland, Scott has found that raising zebrafish at warmer temperatures as [embryos](#) actually improves their ability to adjust to both higher and lower temperatures as adults.

Their research shows the fish are hardier after being raised in a [warm-water](#) nursery, and raises the question of how far the temperature can rise before the advantage becomes a liability, as inevitably it will, Scott says.

“What limits are there to their coping abilities? That’s what we’re really trying to understand,” says Scott, a specialist in animals’ adaptation to challenging environments.

“If we want to appreciate how the natural world is affected by [climate change](#), that’s what we need to know.”

The research appears in the *Proceedings of the National Academy of Sciences*.

Zebrafish are native to freshwater habitats of Southern Asia, and over their lives can experience a range of temperatures from almost 40 C to nearly freezing. The fish under study were raised across the range of

temperatures they would normally experience in their natural breeding season (22 C to 32 C).

The biology of [zebrafish](#) – especially their short gestation period – makes them ideal research subjects.

Scott and Johnston found that when embryos raised in warm water experienced temperature variation as adults, they could swim faster, their muscle was better suited for aerobic exercise, and they expressed at higher levels many of the genes that contribute to exercise performance.

The improvements were true for the adult fish in warmer and colder water alike – a finding that surprised the researchers.

“We thought that they might do better under warmer conditions because they grew up in warmer conditions. We didn’t think they’d also do better under colder conditions, but they did.”

Provided by McMaster University

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