

Picky females promote survival and diversity, new research says

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The new *Nature* study on "picky females" may explain how cichlids, a fish found in Lake Victoria in Africa, can coexist in high diversity in the same habitat. (photo credit: Ole Seehausen, Fish Ecology and Evolution, Eawag, Switzerland)

(PhysOrg.com) -- Picky females play a critical role in the survival and diversity of species, according to a *Nature* study by researchers from the University of British Columbia and the International Institute for Applied Systems Analysis (IIASA) in Austria.

To date, biodiversity theories have focused on the role played by [adaptations](#) to the environment: the [species](#) best equipped to cope with a habitat would win out, while others would gradually go extinct. The new study presents the first theoretical model demonstrating that selective mating alone can promote the long-term coexistence of species – such as

frogs, crickets, grasshoppers and fish – that share the same ecological adaptations and readily interbreed.

"The focus on ecological adaptation has failed to explain much of the biodiversity we see right before our eyes," says the study's first author Leithen M'Gonigle, a postdoctoral fellow at the University of California at Berkeley, who developed this work while a PhD candidate at UBC.

"Our model shows that species can stably coexist in the same habitat as long as two simple conditions are met. First, the distribution of resources they use must not be uniform, so that groups of [females](#) with different mate preferences can occupy different resource hotspots. Second, females must pay a cost for being choosy, through reduced [survival](#) or fecundity," says M'Gonigle.

"Resource distributions are never uniform over space, even in seemingly homogeneous habitats like grasslands and lakes," says co-author Ulf Dieckmann, leader of the Evolution and Ecology Program at IIASA.

"By being picky, females almost always suffer a cost, because they spend energy either to find a preferred mate or to avoid an undesirable one," says UBC zoologist and co-author Sarah Otto, Canada Research Chair in Theoretical and Experimental Evolution and a 2011 fellow of the John D. and Catherine T. MacArthur Foundation.

"These costs turn out to be crucial for reinforcing species boundaries," says IIASA scholar and co-author Rupert Mazzucco. "Because they prevent females with a particular preference from invading areas dominated by males they find unattractive."

Overcoming the long-held belief that species can stably coexist only if they differ in their ecological adaptations, this study is opening up new vistas on understanding and protecting the grandeur of biological

[diversity](#), according to the authors.

Provided by University of British Columbia

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