Study first to show evolution's impact on ecosystems

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Scientists have come to agree that different environments impact the evolution of new species. Now experiments conducted at the University of British Columbia are showing for the first time that the reverse is also true.

Researchers from the UBC Biodiversity Research Centre created mini-ecosystems in large aquatic tanks using different species of three-spine stickleback fish and saw substantial differences in the ecosystems in as little as 11 weeks.

Their findings are published in today's Advanced Online Publication of the journal *Nature*.

Stickleback fish originated in the ocean but began populating freshwater lakes and streams following the last ice age. Over the past 10,000 years - a relatively short time span in evolutionary terms - different species with distinct physical traits have emerged in some fresh water lakes.

The UBC study involved new species found in British Columbia lakes that have evolved distinct physical traits: limnetic sticklebacks (smaller open water dwellers with narrow mouths), benthic sticklebacks (larger bottom dwellers with a wide gape) and a generalist species to represent the probable ancestor of the two species.

"Simply by what they eat and how they live, even young species that have 'recently' diversified can have a major impact on their food web,"

says study lead author Luke Harmon, who conducted the study while a post-doctoral fellow at UBC. He is now an assistant professor at the University of Idaho. "This study adds to a broader body of literature showing that species diversity matters in important ways."

Further analysis showed the tanks with the two newest species had larger molecules of dissolved organic carbon, or bits of decaying plants and animals. This prevented sunlight from penetrating the water and inhibited plant growth.

"Our study shows that through evolution, sticklebacks can engineer the light environment of their own ecosystems," says co-author Blake Matthews, a UBC post-doctoral fellow who is now a researcher at Eawag, the Swiss Federal Institute of Aquatic Science and Technology. "It also demonstrates how speciation of a predator might alter the evolutionary course of other organisms in the food web."

"As new species arise from a common ancestor and evolve new ways of exploiting the environment, each inadvertently reshapes the dynamics of the ecosystem around it," says co-author UBC Prof. Dolph Schluter. "We are just beginning to understand how."

Source: University of British Columbia (news : web)