A continental-scale prediction on the functional diversity of stream microbes

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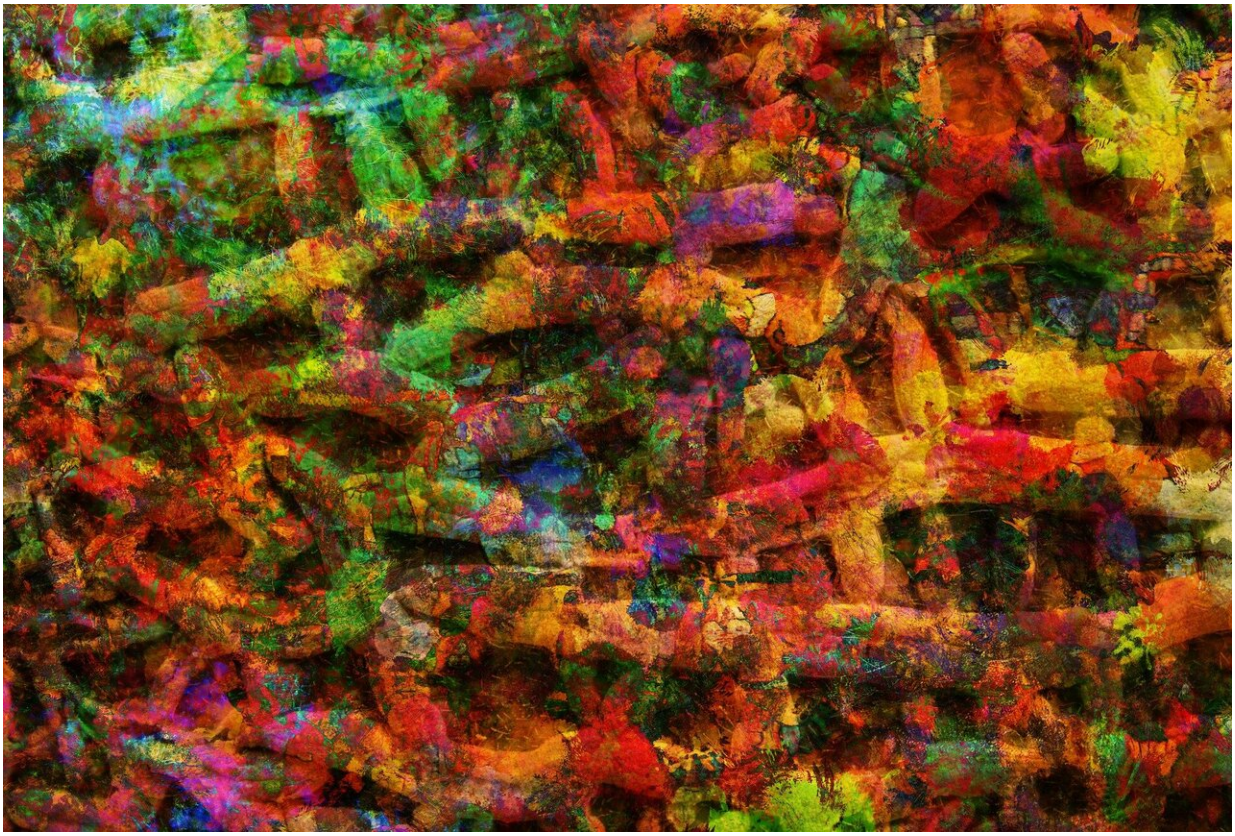

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A recent research find indicates that climate change increases the functional diversity of microbes living in streams. Consequently, climate change may, in certain cases, be beneficial to ecosystems.

The functional genes of microbes and their sufficient diversity are important indicators of the efficiency of ecosystem processes. Bacteria, single-celled fungi and other microbes are an essential element of the nutrient cycle, and their functional diversity boosts the decomposition of organic carbon.

Stream microbe samples were collected in a collaboration among Finnish, Spanish and Chinese researchers. In previous studies utilizing the material collected from mountainous areas in Norway, Spain and China, the focus has been on the species of stream microbes. Now, the frozen samples have been used to identify a total of nearly 16,000 functional genes of three different microbial groups, in addition to which the researchers have completed a forecast encompassing Europe and Asia.

A key to understanding ecosystem processes

The article, published in *Microbiome*, focuses on the diversity and composition of the functional genes of stream microbes.

Based on observations made in the field, a forecast was completed on how the diversity and composition of functional genes will change across Eurasia as a result of climate change.

Stream microbe samples were collected from mountainous areas in Norway, Spain and China. Credit: ianjun Wang

"We saw that the diversity of functional genes in microbes decreases in mountainous areas when moving from warm valleys towards the colder peaks," Professor Janne Soininen says.

Therefore, the functional diversity of microbes is likely to grow as the climate becomes warmer, while ecosystem processes vital to waterways, such as the decomposition of organic matter and nutrient cycling, may become increasingly efficient.

In the case of Eurasia, the change will be most marked in its northern regions where the diversity of functional genes can grow by as much as 30% and the composition of functional genes can change by as much as 35% by 2060–2080 compared to the current situation, depending on the

climate scenario used.

More information: Félix Picazo et al. Climate mediates continental scale patterns of stream microbial functional diversity, *Microbiome* (2020). DOI: 10.1186/s40168-020-00873-2

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