

Ecological genetics of freshwater bacteria surveyed

February 1 2008

Novel molecular techniques have been responsible for major strides in microbial ecology and are addressing broadly important scientific questions about the variety and distribution of microbial life, according to an article in the February 2008 issue of *BioScience*.

The article, “Progress in the Ecological Genetics and Biodiversity of Freshwater Bacteria,” by Jürg B. Logue, Helmut Bürgmann, and Christopher T. Robinson, inaugurates a series of articles in *BioScience* on the theme “21st Century Directions in Biology.” Most issues of *BioScience* will include an article about the impacts of new molecular techniques on a range of biological fields.

The authors of the first “21st Century Directions in Biology” article summarize the history of techniques that allow the study of bacteria that cannot be cultured in the laboratory—the large majority. The first generation of such techniques was focused principally on the analysis of DNA sequences. Research that employed these techniques indirectly shed light on the nature of freshwater environments as a bacterial habitat. A particular problem in the study of freshwater environments is that they fluctuate greatly over time and space. It has become clear, however, that freshwater is quite different from terrestrial soil and marine environments in terms of the bacteria present.

Progress has brought new information to bear on the long-debated question of what exactly constitutes a bacterial species. It has also clarified the role of random events in the distribution of such species:

randomness appears to be a substantial, although not all-powerful, influence.

The newest techniques can analyze specific functional capabilities of bacteria, such as their ability to metabolize particular molecules. Moreover, some techniques can analyze multiple capabilities in parallel. These are being combined with accurate and sensitive measurement techniques. Such research is yielding new understanding of how microbial populations shift in response to environmental change, a question that is likely to loom larger as freshwater becomes a more limiting resource for human populations.

Source: American Institute of Biological Sciences

Citation: Ecological genetics of freshwater bacteria surveyed (2008, February 1) retrieved 27 April 2024 from
<https://phys.org/news/2008-02-ecological-genetics-freshwater-bacteria-surveyed.html>

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