

DNA analysis reveals origin and dispersal of the microorganism Cyanidiophyceae in Iceland

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The microbial species assigned to the taxonomic class Cyanidiophyceae display worldwide, but discontinuous, distribution. How they came to be found in some parts of the world is a matter of debate among scientists. The Cyanidiophyceae, unicellular organisms that diverged from ancestral red algae about 1.3 billion years ago, live in hot springs and other geothermal habitats. Scientists are using DNA sequences to discover biogeographic patterns of these microorganisms, as shown by a study in the journal *Phycologia*.

Researchers collected environmental samples from five locations in Iceland. Using molecular [phylogenetic analysis](#) based on the chloroplast *rbcL* gene, they studied the origin, dispersal patterns, and diversity of Cyanidiophyceae in Iceland.

A remote, volcanic island surrounded by seawater, Iceland is an excellent place to analyze the biodiversity and dispersal of species that thrive in freshwater environments. Iceland has intense underground volcanic activity, creating hydrothermal areas with distinct ecological conditions, such as fumaroles, geysers, and hot lakes, a perfect environment for thermoacidophilic microfloral organisms such as these. However, Cyanidiophyceae are much older than Iceland itself.

Phylogenetic analysis of Cyanidiophyceae revealed two main species inhabiting Iceland, *Galdieria sulphuraria* and *G. maxima*. The only other

areas of the world these species coexisted are New Zealand, Russia's Kamchatka Peninsula, and Japan. Comparison of the Icelandic, Russian, and Japanese populations seems to indicate that Icelandic Cyanidiophyceae originated in and dispersed from northeastern Asia.

In addition to gene sequences, scientists studied past glacial events to discover a pattern of dispersal within Iceland. The southwestern region of Iceland is the diversity center of both the *G. sulphuraria* and *G. maxima* species of Cyanidiophyceae, which migrated to the northeast and southeast of the island.

More information: Full text of "Cyanidiophyceae in Iceland: plastid rbcL gene elucidates origin and dispersal of extremophilic *Galdieria sulphuraria* and *G. maxima* (Galdieriaceae, Rhodophyta):"

www.phycologia.org/doi/full/10.2216/14-032.1

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