Research associate/postdoc – Nitrogen fixation and cyanobacteria in cool terrestrial habitats

Opportunity for field and laboratory analysis of nitrogen fixation and primary production in widespread but neglected habitats dominated by mosses, lichens, fungi and cyanobacteria.

The Biology Laboratory at the University of Iceland in Reykjavík is seeking a research associate/postdoc for a leading role in a three year project supported by the Icelandic Research Fund and the University of Iceland, in collaboration with professor Ólafur S. Andrésson and professor Ingibjörg Svala Jónsdóttir and several postgraduate students. Solid background in terrestrial ecology, analytical methods, statistics, microbiology, with field and laboratory experience is required.

The research will be based at the Biology Laboratory, Faculty of Life and Environmental Sciences at the University of Iceland, but sampling will mostly be during summers in the southern highland area, often under demanding conditions. In addition to terrestrial ecological methods, use will be made of the acetylene reduction assay and 15N isotope labeling, PCR, gene sequencing and advanced methods for determining alternative nitrogen fixation. The Icelandic Research Fund will provide total salary funds of 4500 thousand Ikr per year.

Applicants should contact professor Ólafur S. Andrésson at the University of Iceland (osa@hi.is).

Applications should include a recent CV, a short statement of research interest, names and contact information for two references, and an academic transcript. The application deadline is 1st May 2016 or until an appropriate candidate has been recruited.

Project synopsis

Availability of fixed nitrogen is essential for primary production. We will gather information on biological nitrogen fixation (BNF) in eight defined subarctic habitats (EUNIS classification) representing nearly 90% of cryptogam (lichen, moss and biocrust) cover in uncultivated areas of Iceland; by measuring of BNF, by identification of the bacteria and nitrogen fixation systems involved, including the alternative Vnf system, and by testing hypotheses regarding the major players in laboratory experiments, making use of chemical and isotope analysis, gene sequencing technology and bioinformatics. The objectives are:

1) Obtain reliable estimates of BNF in major cryptogam habitats using ARA (acetylene reduction assay) standardized with 15N uptake.
2) Characterize nitrogen fixing bacteria and main components in the selected habitats using methods of microbiology and gene sequencing.
3) Carry out field observations, plus field and laboratory experiments to quantify cyanobacteria and environmental factors controlling BNF.
4) Establish the contribution of the alternative Vnf system to nitrogen fixation in the cryptogam communities, both in the field and in the laboratory. For this we will a) determine 15N isotope discrimination by mass spectrometry (greater with Vnf than Nif), and b) determine levels of vnf and nif gene expression by reverse transcript quantitative PCR.
5) Extend findings to habitats with same EUNIS classification elsewhere, model BNF and assess global relevance.