

Press Release

## **What future for lichens? – Pan-European “Common Garden” Experiment researches into the reaction to climate change**

**Frankfurt am Main, Germany, June 8, 2011. Hanau started it: an experiment of the Frankfurt-based Biodiversity and Climate Research Centre (BiK-F) was recently initiated, in which lichens are moved to locations which differ significantly in climatic terms from their place of origin, e.g. from the Arctic to Europe. The artificial climate stress should show scientists whether the symbiotic organisms can adapt to climate change, so as to permit them to achieve a better understanding of its influence on terrestrial ecosystems. Within the context of the project financed by the German Research Foundation (DFG), further research locations were established in Norway and in Spain.**

Whether in the polar circle or in the hot desert, lichens are spread all over the world. There are an estimated 1 to 10 million species of fungi, which also include lichens, many of which remain undiscovered. Only recently, an international research group, including Prof. Dr. Imke Schmitt of the Biodiversität und Klimaforschungszentrum and Dr. Christian Prinzen of the Senckenberg Research Institute, described around 100 new species of lichens. By virtue of their symbiotic lifestyle, the community of fungi and algae can also grow in locations which are too inhospitable for other organisms, e.g. because they are too cold or too dry. But can these skilled survivors also adapt themselves to climate change and to major changes in temperature?

### **A study using global drifter lichens**

The Frankfurt-based Biodiversität und Klima Forschungszentrum (BiK-F) has also recently initiated a field experiment in which representatives of the lichen species *Cetraria aculeata* were placed under the magnifying glass. The species is flexible with regard to its living environment and its climate. “We find representatives of *Cetraria aculeata* in moister areas of temperate climate zones like Germany, but also in Extremadura in Spain. Even in the extremely cold polar regions of the Arctic and Antarctic, this species is native,” says Stephanie Domaschke, the leader of the study who is working on her doctoral thesis at the BiK-F on the eco-physiology of lichens. In so doing, she is one of the very small group of 50 scientists researching this field worldwide.

### **Research locations in three European countries**

The same species of lichen may well occur at different locations throughout the world, but according to the geographical location and climate zone, it has evolved different genetic variants, the so-called haplotypes, which are at the centre of the study. At four collecting locations in Stockstadt am Main, close to Madrid and in the northern and southern polar regions, in each case, 20 individuals of the respective haplotypes of the species of lichen were collected and transferred to another climate zone. In this way, the “Common Garden” experiment anticipates the long-term effects accompanying climate change: precipitation and temperature will change in their current living environments. Recently, the new habitats for lichens have become three areas in Finse (in the high mountains in the South of Norway), the vicinity of Madrid and the centre of Germany, in Hanau.

### **Investigations and gas exchange show adaptability**

How the lichens thrive in the new climate will then be measured once a year over the next three to four years. On the one hand, the study will determine whether the lichens have gained in weight and volume. On the other, through an investigation of gas exchange, the uptake of carbon dioxide and release of oxygen by the lichens will be measured, in order to obtain a reading of the degree to which the lichens are carrying out photosynthesis. Outside of Germany, the BiK-F scientist is collaborating on this with the universities in Bergen and Madrid. If everything goes well, the research work will show how adaptable *Cetraria aculeata* is within the context of imminent global warming.

### **Particular attention paid to polar circle lichens**

Particular attention is paid to the examples native to the polar circle, where climate change is likely to lead to drastic increases in temperature. It is quite probable that lichens growing in these areas will be more sensitive to rising temperatures than varieties of the same species growing in Germany. At the same time, in this barren habitat, lichens play a particularly important role in the ecosystem, since of the few species which occur there, they are among the largest producers of biomass. The forecast of how lichens react to climate change thus allows conclusions to be drawn regarding climate-dependent changes in the ecosystem.

### **For further information, please contact:**

Dipl. Biol. Stephanie Domaschke  
LOEWE Biodiversität und Klima Forschungszentrum (BiK-F)  
Phone.: 069 97075 1680  
email: stephanie.domaschke@senckenberg.de

or

Sabine Wendler  
LOEWE Biodiversität und Klima Forschungszentrum (BiK-F), Media Relations  
Phone: 069 7542 1838  
email: [sabine.wendler@senckenberg.de](mailto:sabine.wendler@senckenberg.de)

---

**LOEWE Biodiversität und Klima Forschungszentrum, Frankfurt am Main**

With the objective of deciphering the complex interactions between biodiversity and climate through a wide range of methods, since 2008, the **Biodiversität und Klima Forschungszentrum** [Biodiversity and Climate Research Centre] (BiK-F) has been promoted within the context of the **Landes-Offensive zur Entwicklung Wissenschaftlich ökonomischer Exzellenz** [Land Offensive for the Development of Scientific Economic Excellence] (LOEWE) of the Land of Hessen. The Senckenberg Society for Natural Science and Goethe University in Frankfurt as well as other, directly involved partners, co-operate closely with regional, national and international institutions in the fields of science, resource and environmental management, in order to develop projections for the future and scientifically demonstrated recommendations for sustainable action. For further details, please see [www.bik-f.de](http://www.bik-f.de)