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Rehabilitation of European Biological Soil Crusts – The SCIN project

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The "Soil Crust INternational" (SCIN) Project aims to improve the appreciation and understanding of European Biological Soil Crusts (BSC) with the goal of developing biodiversity conservation and sustainable management strategies. Our objective is to study the uniqueness of European BSC on a local scale and investigate how these communities thrive in areas with such great macroclimatic differences.
In order to cover a wide diversity of European BSC a latitudinal transect was established, extending from the Great Alvar of Öland, Sweden in the north, down to Gössenheim, Central Germany and Hochtor in the Hohe Tauern National Park, Austria, continuing to the Badlands of Tabernas, in southern Spain. The transect stretches over 20º latitude and 2,300 m in altitude and includes natural and also semi-natural sites that require maintenance, for instance, by grazing.
Within the SCIN project a rehabilitation study was initiated in order to investigate the recovery potential of BSC under different environmental conditions. This entailed the construction of 10 times 1m2 plots, alongside control plots, at each of the 4 sites, where the BSC was completely removed. Over the course of 2 years (2012-2014) the plots were sampled regularly to assess recovery in the form of returning organisms (cyanobacteria, algae, lichens, bryophytes, higher plants), soil stability, chlorophyll and carbon content and nutrient composition. Cyanobacteria are considered as the pioneering functional group of BSC establishment in many regions, especially arid, and may be critical for the successful formation of any of the further BSC successional stages. Therefore, the cyanobacterial assemblages of recovering plots are being investigated to shed light on the importance of cyanobacteria in the rehabilitation of BSC and whether individual species or specific communities can be ascribed to a local or wide geographical range. It also has to be considered the proximity of recovering BSC to established crust; in our case a major contributing factor to successful recovery has to be the mature BSC surrounding the plots. Our results so far show however, that this may not be as simple as it seems due to the physical properties of the treated plot, the erosion caused by the lack of BSC may severely affect the ability of returning communities to establish themselves, and therefore the geographical and climatic aspects of the rehabilitation sites play a crucial factor in the sense of minimising erosion as much as possible.
Two years is clearly not a significant amount of time in the rehabilitation of BSC, but this study throws light on the initial stages of recovery and can suggest management practices for future rehabilitation projects.