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Algal Biodiversity of alpine soils and soils from Antarctica

Zur Algenflora alpiner Böden und Böden der Antarktis

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Soil crusts, also known as cryptogamic crusts or microbiotic crusts are an important structural feature of the soil surface in many regions of the world, particularly in regions with extreme environmental conditions (hot, cool, arid, cf. BELNAP et al. 2003, BÜDEL 2003).

These soil surface communities consist of algae, cyanobacteria, lichens, mosses and microfungi. Only in rare cases all components take part in crust formation, quite often there are only one or two of the group involved (BÜDEL 2003).

In the Alps a large variety of different landscapes is to be found. Orographic and (often harsh) climatic conditions result in sparse or absent vegetation cover in many areas (e.g. windswept places of the alpine and nival zones, fluvioglacial deposits in periglacial areas). Also, the open spaces in between higher plants are generally not bare of autotrophic life, but are often covered with soil crusts. However, the important role of these soil crusts in Alpine ecosystems has been more or less underestimated up to now (cf. TÜRK & GÄRTNER 2003).

Climatic conditions on Antarctica are very harsh, making them highly comparable to the environments in the alpine and nival zones of the Alps.

It is not surprising that striking similarities in lichen, algae, and cyanobacteria species between high-altitude areas and deserts (also cold-deserts) have been reported (TÜRK & GÄRTNER 2003). In the current study, the biodiversity of soil algae, which are an important part of these soil crust communities, is investigated using sample material from 4 study sites near the village Vent (Ötztal, Tyrol, Austria) and from one on King George Island (Antarctica) and results are presented. Xanthophyta (particularly trichal forms) are by far the most diverse group encountered, followed by Chlorophyta. Besides typical terrestrial species such as *Chlorella*, *Stichococcus* and *Klebsormidium*, chlorococcalean green alga taxa

with peculiar cell wall ornamentation e.g. *Coelastrella* species are found and seem to be very common and widespread (in the Austrian Alps), unlike previous observations. This study is intended as a contribution to broaden the state of knowledge of soil algae and soil crusts, especially in the Alps.

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