

3D soil structure characterization of Biological Soil Crusts from Alpine Tarfala Valley

Giacomo Mele (1), Laura Gargiulo (1), Laura Zucconi (2), Luigi D'Acqui (3), and Stefano Ventura (3)

(1) Institute for Agricultural and Forest Systems in the Mediterranean, National Research Council, Ercolano NA, Italy (giacomo.mele@cnr.it), (2) Department of Ecological and Biological Sciences, Tuscia University, Viterbo, Italy, (3) Institute for Ecosystem Study, National Research Council, Sesto Fiorentino FI, Italy

Cyanobacteria filaments, microfungus hyphae, lichen rhizinae and anchoring rhizoids of bryophytes all together contribute to induce formation of structure in the thin soil layer beneath the Biological Soil Crusts (BSCs). Quantitative assessment of the soil structure beneath the BSCs is primarily hindered by the fragile nature of the crusts. Therefore, the role of BSCs in affecting such soil physical property has been rarely addressed using direct measurements.

In this work we applied non-destructive X-ray microtomography imaging on five different samples of BSCs collected in the Alpine Tarfala Valley (northern Sweden), which have already been characterized in terms of fungal biodiversity in a previous work.

We obtained images of the 3D spatial organization of the soil underneath the BSCs and characterized its structure by applying procedures of image analysis allowing to determine pore size distribution, pore connectivity and aggregate size distribution. Results has then been correlated with the different fungal assemblages of the samples.