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STSM title: The effect of the 3D-structure and hydrophobicity of different bryophyte communities of biological soil crusts (BSCs) on water movements in drylands.

STSM Host scientist: Prof. Dr. Cristina Branquinho and Dr. Ricardo da Cruz de Carvalho, Centre for Ecology, Evolution and Environmental Changes (CE3C), University of Lisbon, Portugal

Five Keywords: Biological soil crusts, ecosystem rehabilitation, hydrophobicity, bryophytes, desiccation tolerance

Topic summary: This STSM aims at evaluating the effect of bryophyte-dominated biological soil crusts (BSCs) on water movements in drylands by combining soil physical and eco-physiological approaches. Consequently, we hope to gain a better understanding of their potential as tools for ecological restoration.

Methods summary: We installed a mini tension infiltrometer at the host institution in order to assess the relationship between water repellency and desiccation tolerance of different bryophyte BSCs and relate this results to their internal structure, which will be investigated by means of high-resolution micro-CT.

Results and implications for restoration: First results obtained during this STSM show that there is indeed an increase of water repellency from early stage, dark cyanobacterial BSCs to bryophyte-dominated types. This is suspected to be a mechanism developed by the bryophytes to protect themselves from a net-loss of energy by starting the photosynthetic machinery before sufficient amounts of water are available. This hypothesis will be tested by linking the analysis of wettability with their desiccation tolerance. Further, the upcoming analysis of their internal structure will reveal if different bryophyte types influence the pore system of BSCs differently and thereby alter the nature of matter fluxes in the crust.



[Left] Bryophyte-dominated BSCs in the interspace of shrubs near Carrapateira
[Right] Bryophyte-dominated BSCs stabilizing a sandy cliff near Vila Nova de Milfontes