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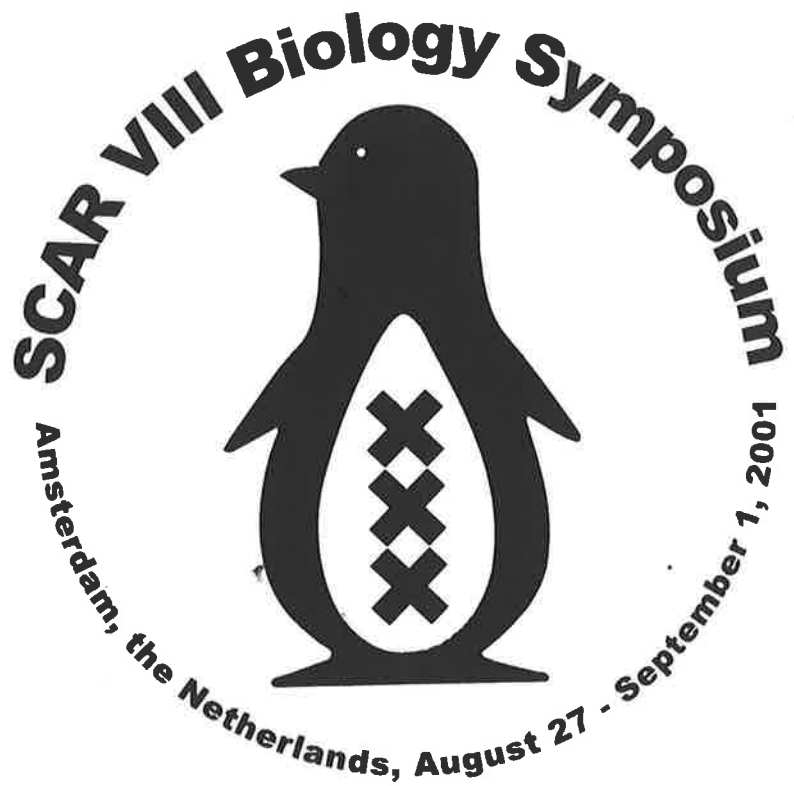

Programme & Abstracts

INTEGRATED STUDY OF ENDOLITHIC ANTARCTIC MICROORGANISMS AND THEIR MICROHABITATS

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One of the most outstanding features of terrestrial life on the Antarctic continent is the predominance of rocks as substrates for living organisms. Although the study of micro-organisms colonising the inside of lithic materials confronts with considerable difficulties, the detailed mineralogical and biological characterisation of endolithic niches is essential for understanding the dynamic relationships between rock-dwelling micro-organisms and their microhabitats. Several microscopy and microanalytical approaches need to be combined, including scanning electron microscopy with back scattered electron imaging (SEM-BSE), low temperature scanning electron microscopy (LTSEM), confocal scanning laser microscopy (CSLM), and the X-ray energy dispersive spectroscopy (EDS) microanalytical system. These techniques have allowed the simultaneous description of these micro-organisms and their habitats. Further, integration of all the information generated by such methods provides deep insight into the ecological functioning of lithobiontic communities. SEM-BSE images have allowed us to observe that the fissures and cavities of rocks harbour a great diversity of micro-organisms forming different associations. Information on the spatial distribution of the micro-organisms inside the rock, along with approximations as to the number of organisms occupying a particular volume is provided by CSLM. Lithobionthic communities have been shown to interact with their substrate, giving rise to micas exfoliation and biomineralisation processes (e.g. precipitated calcium oxalate). The EDS technique coupled to SEM-BSE permits the chemical characterisation of mineral features and the detection of biomobilisation and biomineralisation process in a particular area. Indeed, the simultaneous application of the four techniques to the same area, "correlative microscopy", is an excellent tool for the integrated study of these microhabitat/organism interactions.

Analysis of the complete cycle of endolithic life in the harsh, unstable Antarctic habitat would not be complete without also considering decay and fossilisation processes. To this end, the combined use of SEM-BSE and EDS has served to detect mummified and microfossilised micro-organisms within Antarctic rocks.