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Differential mechanisms of biomineralization and implications in fossilization.

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The fullest possible understanding of microfossil assemblages requires that one appreciate the nature of *post-mortem* process and the loss of information attendant such process. Biomineralization and degradation processes can act in the *post mortem* stage in to opposite directions. Taxa able to precipitate minerals (biomineralization) can be further preserve and increase the apparent diversity through the selective destruction of less resistant taxa or taxa inhabiting environments wherein preservation or biomineralization is less likely. Several years ago, it was not possible to make general *a priori* assumptions about the direction in which *post-mortem* degradation will push the apparent diversity of any specific assemblage, but recent studies have found the relation between the living organisms and fossils through an *in situ* approach (Wierzchos & Ascaso, 2001), then an important source of information it is still unexplored with the appropriated tools.

To enhance our ability to extract palaeobiological and paleoenvironmental information from ancient carbonate deposits, we have studied the processes responsible for the development and preservation of fossils in modern tufa formations in Lagunas de Ruidera (Castilla La Mancha, Spain). We studied specimens collected from immersed and emerged tufa using scanning electron microscopy by backscatterred electron detection imaging. Although it is known that moss tufa formations are mainly

form as an abiotic process, we have found that the lithobiontic community contains diverse morphological textures indicatives of different microorganisms contributing to the microstructural development of the tufa. We have also found that the preservation of biotically produced microfabrics in the tufa reflects dynamic balances between population colonization, decomposition of organic matter and fast calcium carbonate deposition. Major trends in preservation of the endolithic biofilm inside the tufa are defined by differences in the mode of fossilization, replacement, encrustation and permineralization. The application of *in situ* microscopy methods permitted describe the relationship between biomineralization processes happening in the living community, the *post-mortem* degradation and detecting traces of the past presence of microbial communities in geological materials.

WIERZCHOS, J., and C. ASCASO. 2001. Life, decay and fossilization of endolithic microorganisms from the Ross Desert Antarctica: suggestion for *in situ* further research. *Polar Biology* 24: 863-868.