

Contribution of cyanobacteria to the building of travertines in a calcareous stream

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The ambient temperature travertine deposits of the calcareous Hoyoux River (Modave, Belgium) and several tributaries are organized and promoted by the filamentous cyanobacterium identified by its morphotype and ecological properties as *Phormidium cf. incrustatum*. A combination of techniques was used to study this biotope: physico-chemical parameters and CO₂ measurements, Scanning and Transmission Electron Microscopy, RAMAN microspectroscopy. A molecular diversity study with pyrosequencing of the cyanobacterial 16S rRNA is in progress. A potential candidate was isolated in culture. The cyanobacterium produces extracellular EPS sheaths that promote rapid calcification and produce a rigid skeleton-like framework of the porous travertine texture. Pigments and filamentous textures are preserved but only locally at the micron-scale, due to rapid secondary recrystallization. The cellular trichomes move out of the deposit by gliding while abandoning the calcified sheath which is left inside the deposit. The chemistry of carbonate supersaturation of the river water depends on biological processes at the scale of the entire watershed whereas the precipitation of carbonate is largely caused by CO₂ – degassing. However, the porous texture of the deposit, the direction of its accretion and its position along the river valley are determined by the growth orientation and ecological preference of *Phormidium cf. incrustatum*. Several types of freshwater microbialites are produced in travertines as well as large scale reef-like structures capable of changing entire landscapes. This process has a regulatory function as it converts the river into a series of ponds and lakes separated by travertine barriers and interconnected by waterfalls.