

Microclimatic factors affecting composition and distribution of of phototrophic communities in monuments

X. Ariño¹, A. Gomez Bolea², C. Saiz-Jimenez³

¹ BMA S.L

² Universitat de Barcelona, Unitat de Botànica

³ Instituto de Recursos Naturales y Agrobiología de Sevilla (CSIC), Spain
(RTPHC-CSIC)

ABSTRACT

Buildings, monuments and archaeological sites are usually associated with rapid biological colonization, especially by pioneer microorganisms of bacteria, actinomycetes, cyanobacteria, algae, fungi and lichens, a natural process creating a living mosaic of colours and textures.

As far as microbial organisms is concerned, it has been suggested that while both the composition and the structure of the substratum are important in determining the nature and composition of communities, it is the microclimatic factors which determine the abundance and distribution of these organisms. Both colonization and distribution of taxa are directly related to the environmental conditions and some communities replace others depending on the orientation. Of these, moisture availability is the major constraint affecting microbial diversity.

Cyanobacteria, algae and lichens, among photosynthesis-based organisms, are the pioneers that inhabit dry walls receiving abundant sunlight. In addition, there is a certain variability in the ratio of the number of taxa of cyanobacteria vs algae depending on the availability of water.

The presence of such communities, and their total biomass, is a consequence of a number of factors affecting the monument at the long-term. For this reason, the close relationship between these communities and microclimatic factors suggests that it may be possible to use them for biomonitoring, as a tool for assessing climatic global change. On the other hand, small changes on microclimate may represent a significant disturbance on the natural balance between organisms and the subsequent modification of biodeterioration processes, including those from an aesthetic point of view.

Corresponding author: dtec@bmasl.com