



## International Course on Stone Conservation SC13

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**SESSION:** Ecology and mechanisms of biodeterioration

**INSTRUCTOR:** Giulia Caneva

**TIME:** Monday, 27<sup>th</sup> May/ 9:30-11:00 (1.5 hours)

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### SESSION OUTLINE

#### ABSTRACT

The biodeterioration of materials is closely correlated to the chemical and the chemico-physical natures of the substrate as well as to the characteristics of the surrounding environment. In other words, there is a complex system of interrelationships between organisms, materials and environment that directs our understanding of the genesis, the dynamics and the peculiarities of alteration phenomena in materials.

Knowledge of the ecological requirements of various organisms and the influences that environmental parameters have on biological growth is very relevant for the prevention of biodeterioration processes. Inversely, this knowledge is equally relevant when using the presence of particular organisms as bioindicators of environmental parameters.

#### OBJECTIVES

By the end of this session, participants will be able to

- describe the main biodeteriogens of stone (bacteria, algae, fungi, lichens, and higher plants)
- describe the main biodeterioration processes linked to growth of biological organisms on stone monuments, and
- explain the ecological factors affecting the growth of microorganisms and organisms on stone (e.g. water content, temperature, nutrients, and porosity).


#### CONTENT OUTLINE

- The aim of a biodeterioration study for stone conservation.
- The importance of an ecological approach.
- Examples of biodeteriogens and of differential influences of ecological factors.

#### READINGS

 = Essential reading material

 = Available online

 Caneva, Giulia, Maria Pia Nugari, and Ornella Salvadori, ed. 2008. *Plant Biology for Cultural Heritage: Biodeterioration and Conservation*. Los Angeles: Getty Conservation Institute. 35-96.

Caneva, Giulia, Avinoam Danin, Sandra Ricci, and Cinzia Conti. 1994. The Pitting of Trajan's Column, Rome: An Ecological Model of Its Origin. In *Conservazione Del Patrimonio Culturale: Recerche Interdisciplinari*. 78-102. Contributi Del Centro Linceo Interdisciplinare "Beniamino Segre" No. 88. Roma: Accademia nazionale dei Lincei.



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## SESSION OUTLINE CONT'D

- Caneva, Giulia, Daniele Di Stefano, Ciriaco Giampaoloc, and Sandra Ricci. 2004. Stone Cavity and Porosity as a Limiting Factor for Biological Colonisation: The Travertine of Lungotevere (Rome). In *Proceedings of the 10th International Congress on Deterioration and Conservation of Stone, Stockholm June 27 - July 2, 2004*. edited by Daniel Kwiatkowski and Runo Löfvendahl. Vol. 1. 227-32. Stockholm: ICOMOS, Sweden.
- Caneva, G., O. Salvadori, S. Ricci, and S. Ceschin. 2005. Ecological Analysis and Biodeterioration Processes over Time at the Hieroglyphic Stairway in the Copàn (Honduras) Archaeological Site. *Plant Biosystems: An International Journal Dealing with all Aspects of Plant Biology: Official Journal of the Societa Botanica Italiana* 139 (3): 295 - 310.

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