

SOILS, PAST LANDSCAPES AND CULTURAL HERITAGE: PHYTOLITHS AS INDICATORS OF ANCIENT CROPS

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Soils may contain and preserve very important archaeological evidences for the understanding of cultural landscapes of the past. They help to provide information on the history of the landscape, the development of agriculture and settlements.

Main aim of the EC-FP7 MEMOLA project is reconstructing past landscapes and agricultural managements in mountainous Mediterranean areas (~1,000 years ago), studying the cultural and natural heritage and carrying out land evaluations for proposals of future agricultural scenarios having positive impacts on local society and economics. One of most recent findings in the MEMOLA is the excavation of buried ruins of a fortified granary of the Islamic period in north-western Sicily.

Excavations of this archaeological site revealed a stone-built structure with, at least, more than 58 cells having average size of 3x3 meters. Artefacts and many other evidences indicate that those cells have been used during the Islamic period mainly as protected stores for the conservation of seeds. Archaeological excavation of some cells has highlighted that cell floors were made by in-situ earthy material mixed with coarse gravel. From a pedological point of view cell floors are today buried anthropogenic soils. Combining archaeological, botanical and pedological surveys we studied phytoliths as possible indicators for the identification of plant species cultivated for crop production in the Islamic period.

Phytoliths are produced in the cells of living plants. They consist of opal biogenic silica ($\text{SiO}_2 \cdot n\text{H}_2\text{O}$) formed by inorganic polymerization processes. Once the plant dies, phytoliths are released in the environment due to the decomposition of the organic matter. Depending on the type of activities carried out by the human, groups of phytoliths enter of soils and sedimentary assemblages. They are good indicators of past vegetation cover and environmental conditions, they can give evidence of the paleoenvironment or vegetation change. Phytoliths were extracted from soil samples and archaeological sediments using a method resulting from a combination of three standard approaches. The extracted silica bodies were then observed with a bright field Leica DM5000 microscope, and with an EVO 50 Scanning Electron Microscope (Carl-Zeiss, Oxford, UK) fitted with detectors for both Electron Backscattered Diffraction (BSD) and Variable Pressure Secondary Electron Scanning (VPSE). Phytoliths belonging to *Hordeum* and *Triticum* genera were documented among others. The presence, particularly in the archaeological sediments, of dark opal bodies suggested occurrence of fire. The distribution and abundance of phytoliths in the archaeological site validate the hypothesis of its use by humans as storage rooms for seeds and indicate the most frequent crops cultivated during the Islamic period.

Soil provided such valuable information regarding the natural and cultural history. For this and other ecosystem functions it deserves to be protected.

Key words: cultural landscapes, pedo-archaeology, phytoliths, FP7-MEMOLA