

Biological Diversity on an Industrial Heritage Structure: The Case Study of a 20th Century Water Tower

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The objective of this study was to assess the biological colonization on the historic reinforced concrete water tower at the Civil Abattoir, Marsa, Malta as part of a restoration project. Given that restoration works were going to be carried out on this 20th century Industrial Heritage structure it was important to characterize the biological patina present prior restoration works for documentation and conservation purposes. In an effort to identify and document the organisms present the outer surfaces of the structure was surveyed and samples were systematically collected and identified utilising morphological and chemical studies.

The outer surfaces of the examined structure were found to be colonized by saxicolous crustose lichens with predominant species belonging to the genera of *Flavoplaca*, *Myriolecis*, *Lecania*, *Variospora* and *Xanthocarpia*. The occurrence and development of lichen communities was found to be restricted by local environmental conditions. The macrofloral patterns varied according to aspect, inclination and according to structural elements and stability of the substratum. South facing vertical walls were devoid of any lichens due to the severe deterioration and extensive surface detachment areas. In contrast north and west facing vertical surfaces receiving diffuse sunlight were colonized by a variety of species belonging to the genus *Myriolecis*, *Lecania* and *Xanthocarpia*, particularly in crevices between exposed aggregates on rough surfaces. Horizontal surfaces receiving direct sunlight at the top of the structure were dominated by an orange black crust dominated mostly by species of *Variospora* and *Xanthocarpia*. Exposed metal structures favoured another community type dominated by *Flavoplaca* and *Lecanora* species both in shaded and exposed locations.

The results obtained from this reconnaissance assessment provided an opportunity to gather information on lichen biodiversity and community types present on early 20th century concrete material as an artificial substrate, as part of an integrated restoration project. This assessment presents a first study on lichen biodiversity on historic concrete in the Maltese Islands and serves as a base study for future investigation in order to better understand the behaviour of lichens communities on this particular substrate type.