

BOOK OF ABSTRACTS



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PHYLOGENETIC CLUSTERING AS A TOOL FOR LONG-TERM MONITORING OF PLANT COMMUNITIES IN ROCKPOOLS

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The use of temporary freshwater rockpools as sentinel systems for climate change is favoured by the small size of these pools and the annual life-cycles of many of their plant species. This function is, in turn, dependent on the sensitivity of long-term monitoring programmes to floristic changes that may indicate directional shifts in community composition.

We hypothesise that phylogenetic clustering or dispersion of the macrophytes colonising pools and the humid ecotones around their margins may represent an effective method for detecting such shifts.

We carried out a preliminary assessment of the effectiveness of using phylogenetic patterns as a monitoring tool by analysing a series of species lists for a number of pools in the Maltese Islands. The Net Relatedness Index (NRI) and Nearest Taxon Index (NTI) were calculated for each pool using Phylocom software and compared across pools after taking morphometric heterogeneity into account. In general, deeper basins with long hydroperiods and restricted ecotones were characterised by lower values of NTI and higher NRI, both indicative of phylogenetic clustering, suggesting that abiotic filtering was the dominant process in structuring the macrophyte community. Conversely, shallower basins with shorter and more fragmented hydroperiods displayed higher NTI and lower NRI indicating competitive exclusion as a key community process in these zones. Collection of data from a large number of pools was used to construct a NTI-NRI continuum axis along which any given pool may 'migrate' in response to climatic warming. Monitoring of the mean positions of individual pools along this axis may be used to detect any directional changes in the relative significance of abiotic filtering and competitive exclusion in the structuring of communities. Such shifts may be caused by changes in hydroperiod duration and fragmentation which, in turn, would reflect climatic cycles.

Further tests of this method are planned, in order to indicate whether this approach provides a viable alternative to interannual comparisons of species lists as part of long-term monitoring programmes.