'Proximity' and its effect on community assembly in temporary freshwater pools in Malta

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Extended abstract

The relative contribution of 'regional' and 'local' factors in determining species richness of aquatic macrophytes, filamentous algal and microcrustacean taxocenes was investigated in 17 temporary freshwater pools from four pool landscapes in Malta. The pools were visited weekly throughout one wet season, from September 2012 to March 2013. Coverage and abundance of macrophytes (including Charophytes) and filamentous algae was assessed during each visit whilst microcrustaceans were collected, using standard sweeps with a plankton net, in September, November, December and February. Basin morphometry (surface area, depth profile, sediment depth) was characterised for each pool during the dry season whilst *p*H, nitrate, nitrite and phosphate content of pool water were measured during hydroperiod. The distances between pools and the connectivity between them were also determined.

The results indicated that spatial separation between pools was more important than environmental factors in determining community similarity across pools. In general, nearby pools hosted more similar communities than distant ones and pool clusters were found to be distinct from one another with respect to the total species richness. This supported the mass effects metacommunity perspective, showing that dispersal limitation may be one of the main mechanisms in structuring this particular metacommunity

Colonisation of pools by aquatic macrophytes and non-filamentous macroalgae was limited by dispersal at the regional but not at the local level, whilst in the case of micro-crustaceans, dispersal was not entirely limiting at the regional scale. This result showed that inter-pool distance was not a good physical barrier between certain pools, however it could also be the case that pool clusters were not distinct from one another due to differences in environmental variables. In fact, micro-crustaceans were the only taxocene that nearly showed a significant difference with respect to environmental variables, meaning that intermediate dispersal might have been sufficient for micro-crustacean species to reach a suitable patch, having the required environmental factors. Neither spatial nor environmental variables were able to explain the variance between filamentous algal communities across pools.

The relationship between community composition and regional and local scales of observation was complex and was dependent on whether flora or fauna were being considered. Dispersal limitation may be one of the main mechanisms in structuring this particular metacommunity. Priority effects might have also played a role in shaping these communities since monopolisation of resources by the first pool colonisers could have resulted in biological barriers to late colonisers.

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