

# Ostracod fauna from the ancient Magdala harbor (Kinneret lake, Israel)

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Abundance, species diversity and composition of ostracod assemblages, as well as the presence of ecophenotypical features on valves (nodes), are function of several environmental parameters, including water temperature and depth, salinity, hydrochemistry, oxygen, productivity and substrate (Holmes & Chivas, 2002). In this regard, ostracods are considered one of the most efficient biostratigraphical markers in ancient harbor sequences, as human activities can lead to notable modifications in productivity/trophic levels, bottom oxygenation and heavy-metal pollution (Marriner & Morhange, 2007).

At present a wide literature reporting the ostracod content of sea-port sequences is available, while few studies only have focused on the ostracod fauna of lacustrine harbor successions. Around the freshwater

Kinneret Lake (north Israel) recent excavations performed within the framework of the “Magdala project” at the ancient city of Magdala (De Luca, 2009) have unearthed a harbor structure ranging in age from the late Hellenistic to middle Roman period (ca. 167 BC-270 AD). Quantitative ostracod analyses performed on two key stratigraphic sections, excavated in front of the Roman dock, provide insights into the palaeo-environmental evolution of the harbor area (Sarti *et al.*, 2012).

An oligotypic ostracod fauna, very similar to that observed within the present-day lake basin at ca. 5 m water depth (Mischke *et al.*, 2010) and dominated by smooth and noded forms of opportunistic, true euryhaline species *Cyprideis torosa*, characterizes the sandy succession recorded at the bottom of the sections. This fauna composition reflects the capability of colonizing species *C. torosa* to tolerate high-energy sandy bottoms typical of beach environments.

Upwards, in correspondence of dark silty deposits *C. torosa*, mainly reported as noded form, is still the dominant species. However, an abrupt abundance increase of taxa preferring fine-grained substrates and high-organic stagnant waters, as *Pseudocandona albicans*, is coherent with the establishment of a protected basin, whose origin should be related to the construction of Magdala harbor during the late Hellenistic period (“anthropogenically forced sheltered basin”; Sarti *et al.*, 2012). Although the origin of ecophenotypical nodes is still matter of debate, especially about the second controlling factor in addition to low salinity (“factor X” in van Harten, 2000), the higher proportion of noded forms of *Cyprideis torosa* within basin deposits, relative to the underlying beach sands, possibly reflects stressed environmental conditions connected to high pollution levels induced by harbor activities. This interpretation is supported by geochemical analyses on hosting sediments, which show anomalously high trace metal concentrations (Zn, Pb and Cu).

## References

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