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Seasonal and temporal dynamics of macrophytic assemblages and abiotic parameters of coastal lagoons in Western Greece (Mediterranean Sea)

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Coastal lagoons are considered naturally stressed systems that experience frequent environmental disturbances and fluctuations and they are usually considered as physically controlled ecosystems. Coastal lagoons of Western Greece are representative of four different lagoon types covering a wide range of physiographical and hydrological characteristics. The seasonal differences in the physico-chemical parameters monitored from 2005 to 2007 were reduced in lagoon types (II and III) which characterized by better seawater communication when compared with the chocked lagoon types (Type I and IV). The latter types showed lower salinity values and high nutrient concentrations especially during the wet period.
The macrophytic assemblages of coastal lagoons are typically dominated by few genera with great environmental plasticity and salinity competition, among other structuring abiotic variables. The implementation of DCA analysis revealed five distinct macrophytic assemblages in which dominant species were the angiosperms Zostera noltii, Ruppia cirrhosa, Cymodocea nodosa, Potamogeton pectinatus, the charophytes Lamprothamnium papulosum and Chara hispida f. corfuensis, as well as species preferring more marine conditions such as Acanthophora nayadiformis and Cystoseira barbata. The lagoon type IV differs from all other distinguished lagoon types due to the dominance of the species Potamogeton pectinatus and the charophyte Chara hispida f. corfuensis. Regarding the macrophytic assemblages and the univariate variables, important differences were recorded between lagoon types. Chocked lagoons showed low number of species and Shannon diversity index comparing with restricted lagoon types (Types II and III). The multiple linear regression analysis showed that transparency, pH, nitrates, alkalinity and Chl-a could affect the values of the above variables.
A decline of angiosperms was referred on a worldwide scale and recorded also in coastal lagoons of Western Greece. A gradual loss of Zostera noltii was recorded during the monitoring period in lagoon type I. The important salinity alterations caused the replacement of the species by the angiosperm Ruppia cirrhosa. The angiosperms Ruppia cirrhosa and Cymodocea nodosa were the dominant species showing their higher average abundance during the dry period. The results of the current research could provide a general framework for the protection and management strategy of coastal lagoons.