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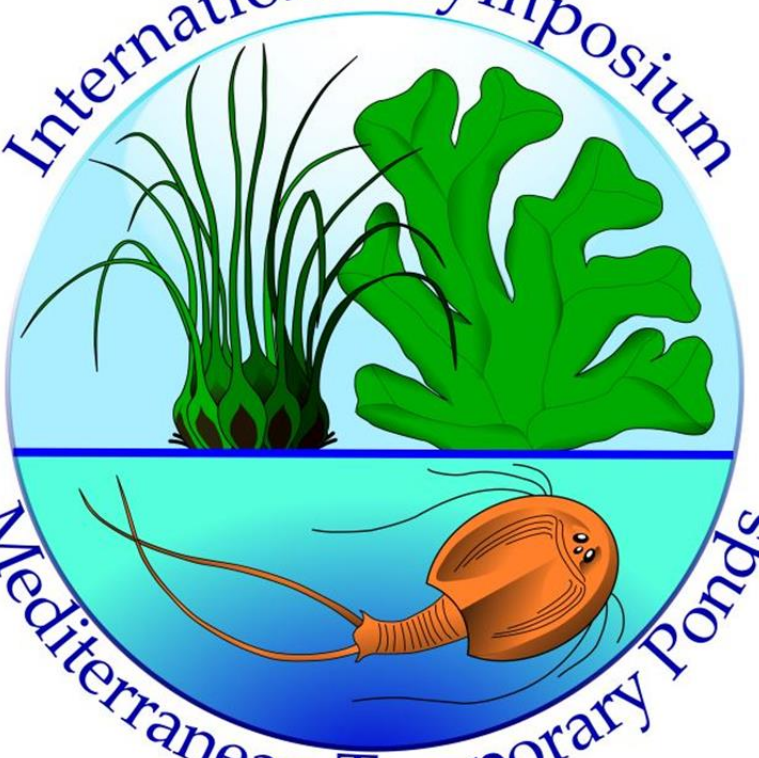

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A NEW TOOL FOR THE ASSESSMENT OF SEVERE ANTHROPOGENIC EUTROPHICATION IN WETLANDS UNDER INCREASING HUMAN PRESSURE

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It is about time the assessment of trophic state in wetlands is no longer estimated through the regressions and thresholds modelled for deep-stratified lakes where sediment nutrient recycling was purposely neglected. We are in badly need of a system trophic indicator to be used as a reference for biological indicators. The recent use of biological communities (macro-invertebrates, diatoms, etc) for the evaluation of the "ecological state" of a water body implicitly requires the assessment of its "trophic state". We need a sediment approach to change the concept of "trophic state" in shallow systems from that currently used in lakes in order to account for the expected higher productivity (and hence naturally higher eutrophy) of shallow aquatic systems compared to lakes within the same area. More so in wetlands of the Mediterranean-climate region where sediment-water interactions and its associated benthic productivity are particularly relevant to primary production. The ever increasing pressure on Mediterranean wetlands, however, makes it more difficult to distinguish between natural eutrophy and anthropic eutrophication due to direct impacts on hydrology (that changes both the quantity and quality of water), and to the long-lasting effect of diffuse nutrient pollution on small endorheic water bodies. Primary production in shallow systems can be modelled as a function of nutrient availability during spring-summer growth where sediment plays an important role in the availability of dissolved inorganic phosphate depending on its capacity for P-adsorption. Dissolved inorganic N can also limit primary production whenever denitrification processes dominates the N-cycle though we have primary focused on P-bioavailability by exploring some of the predictions of the chemical equilibrium of P concentrations between sediment and water modelled by Golterman (2004). In this sense, we can expect that in shallow systems where the P-sediment capacity has not been oversaturated by severe nutrient anthropic loads, the relationship between particulate-P and total-P in the surface water may be equal or close to a 1:1 ratio. Furthermore, a ratio above 1:1.3 would indicate a severe deviation from the equilibrium as a consequence of anthropic eutrophication since the dissolved inorganic phosphate concentration was modelled as the cubic ratio of P-sediment (Golterman, 2004). We, then, forecast that in highly protected wetlands this 1:1 ratio will be observed, whereas it will not be so in other systems with less protection or more impacts. This tool was validated across a wide spectrum of soil, hydrology and land use factors.