**Integrating the impacts of N pollution on the structure and functioning of Mediterranean ecosystems**

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Increased nitrogen (N) availability affects ecosystem stability at local and global scales and is transforming the way we deal with N, i.e., it is changing from being a limiting nutrient to a pollutant. Little is known about the effects of N deposition on Mediterranean Basin ecosystems, which have experienced intensive human development and impact for millennia, and where N deposition is expected to increase threefold by 2050.

Many studies have addressed single aspects of the impacts of N pollution on Mediterranean ecosystems: anthropogenic N deposition, changes in species diversity, impact on soil-atmosphere gaseous fluxes, NO3- leaching, soil microbiology and organic matter decomposition, etc. However, the impacts of driver changes across European Mediterranean ecosystems are poorly understood and have been hampered by a lack of integrated system-level studies. Therefore our aim was to develop an integrated system-level approach to study the responses of nutrient poor Mediterranean ecosystems to increased N availability. Specifically we focus on the cascading interactions between structure and functioning of above- and below-ground communities to understand whether:

- Changes in N dose and form affect N biogeochemistry and biodiversity;

- Alleviating N limitation may exacerbate other limitations (e.g. phosphorus and water);

- Changes in ecosystem structure translate into changes in ecosystem functions and services; and

- These structural and functional changes can be related to land use.

We have been applying two complimentary approaches to answer these questions, by focusing on an N gradient and an N-manipulation field experiment located in southern Portugal. Identifying structural and functional indicators of increased N availability and refining the N critical loads for Mediterranean ecosystems is a major goal of our research, thus putting our science at the service of society, in general, and policy makers, in particular.