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Effects of water and thermal stress on microbial respiratory activities in soils following a gradient of aridification

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In recent decades the Mediterranean climate has been marked by a significant reduction in summer precipitation especially in arid and semi-arid regions. This overall trend would be accompanied by a greater frequency of extreme events such as torrential rain, heat wave, drought that have a direct impact on the soil microorganisms. The objective of this study was to see if the aridification gradient affects microbial communities by decreasing their quantity and to see if drought cycles are expected to induce a loss of resistance and resilience of microbial functions To water stress (drying/wetting cycle).Our results showed a significant difference in basal respiration recorded between the humid, semi-arid, and arid zones, resulting in an increase and decrease in respiratory activity relative to the aridity gradient, respectively. . This shows that the response of basal respiration to water stress depends on the area of study and the climatic stress specific to each region.

Keywords: Basal respiration, arid, semi-arid, humid, soil, forest

INTRODUCTION

Soils are considered to be non-renewable in the short and medium term, and are particularly threatened by human activities and climate change.

The main threats to soils are erosion, decreased organic matter content, local and diffuse contamination, waterproofing, settlement, reduction of biodiversity, salinization and flooding and landslides of land. The soil capital is then considered as a set of stocks, which increase or depreciate, and which has a multifunctional character (Ollivier, 2008). In Algeria, the natural capital Sol represents an important part of the national wealth, but unfortunately we see in recent decades a rapid degradation of agricultural, forestry and urban soils. Especially soils in semi-arid and arid regions that is very sensitive to environmental changes. For these regions, a positive relationship is often proposed between the average rainfall and the environmental data, by scientists belonging to various disciplines. All these regions have the peculiarity of having climatic, physical or biological conditions which do not allow the development of a large plant cover (Belnap, 2003). However, the nature and abundance of species or kinds of micro-organisms appear to be dependent on local eco-biological and climatic conditions (Belnap, 2003).

Extreme disturbances and stresses result in the death of micro-organisms or induce their entry into dormancy (Suzina et al., 2004) and by consequences, disrupt the functioning of the ecosystem. However, the phenotypic and physiological plasticity of micro-organisms allows them to acclimatize or adapt rapidly to environmental stress.

The objective of this research was to identify the