4º Encontro Ibérico de Ecologia
4º Congreso Ibérico de Ecología
Coimbra, Portugal • 16 a 19 Junho de 2015 / 16 a 19 de Junio de 2015

A Ecologia e os Desafios Societais
La Ecología y los Retos Sociales
Oak decline reduces the stability of soil processes against changes in soil moisture and temperature predicted by climate change scenarios

Ávila Castuera, J.M.¹, Gallardo, A.², Gómez-Aparicio, L.¹

(1) Instituto de Recursos Naturales y Agrobiología de Sevilla, (2) Universidad Pablo de Olavide.

Cork oak forests (*Quercus suber*) of the Iberian Peninsula are affected by severe problems of tree decline and mortality induced by global-change drivers such as exotic pathogens (*Phytophthora cinnamomi*) and climate change. Previous studies have shown that oak decline translates into alterations of ecosystem processes such as mineralization and nutrient availability. We hypothesize that these indirect impacts of global change on soil processes might be amplified in a near future by direct effects of changes in temperature and rainfall on soil processes. To test this hypothesis, we conducted a factorial experiment where we analyzed the effect of projected changes in climate on C mineralization and N and P availability in soils taken under *Q. suber* trees differing in health status (healthy, defoliated, dead). Soils were incubated during a 28-day period under three different scenarios of temperature (average spring, +3ºC and +5ºC) and four soil moistures (wet spring, the average spring soil moisture, a reduction of 20% in soil moisture and an extremely dry spring). We detected a general reduction in C mineralization and N and P availability as a consequence of a decrease in moisture; meanwhile the increase of temperature had a low impact on these variables. However, the negative effect of moisture reduction on soil variables was higher under defoliated and dead trees than under healthy trees. In summary our results suggest that the process of oak decline induces changes in soil properties that reduce their stability against the direct impact of climate-change type drought.