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Structural and functional responses of fungal communities to biotic and abiotic factors in Mediterranean pine forests

A. Rincón Herranz, Mario Zabal-Aguirre, Dulce Flores-Rentería, Santiago C. González-Martínez, Marc Buée, Leticia Pérez-Izquierdo

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XIV MEDECOS & XIII AEET meeting

Human driven scenarios for evolutionary and ecological changes

Abstract book

31st January - 4th February 2017
Seville, Spain



Abstract book of the XIV MEDECOS & XIII AEET meeting,
Seville, Spain, 31st January - 4th February 2017

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XIV MEDECOS & XIII AEET meeting

MEDECOS is an international conference organized by ISOMED, the International Society of Mediterranean Ecology, which aims to bring together the scientific community interested in Mediterranean ecosystems. **AEET** is the Spanish ecological society mainly devoted to terrestrial systems.

The origins of MEDECOS date back to March 1971, when an international group of scientists convened in Valdivia, Chile, to discuss their work on Mediterranean-climate ecosystems. MEDECOS has been hosted every 3-4 years in different locations of the five Mediterranean areas of the world (Mediterranean Basin, SW Australia, California, Central Chile and the Cape Region in South Africa). In 2017, MEDECOS will be at the University of Seville (Spain), in the “*Reina Mercedes*” Science Campus, simultaneously with the biennial meeting of the Spanish Association for Terrestrial Ecology (AEET).

The main focus of the joint conference is the ecology and evolution of Mediterranean ecosystems and their species, from plants to animals and also microorganisms. By uniting scientists and students whose research focuses on Mediterranean ecosystems, we expect to gain insights into the similarities and differences in how they function, change and evolve. The conference will also host a regular AEET meeting, thus more general topics on any aspect of ecology will be also considered.

The Conference main topics are:

- Comparative ecology and evolution
- Historical biogeography of Mediterranean lineages
- Current species conservation challenges
- Biodiversity: species interactions, networks, communities and phylogenetics
- Evolutionary and ecological drivers of Mediterranean ecosystems as biodiversity hotspots
- Ecophysiology and functional traits
- Ecosystem functioning and services: challenges and risks in a changing world
- Consequences of biotic and environmental global changes for Mediterranean ecosystems

This meeting is co-organized and supported by the Spanish Association for Terrestrial Ecology (AEET), the Doñana Biological Station (EBD-CSIC) and the University of Seville (US).



Sp.02-21-Oral

Mechanisms of leaf litter decomposition under climate change: trait, microbial, and environmental effectsPrieto Aguilar, I.¹, Almagro, M.², Bastida, F.³, Querejeta, J.I.⁴

(1) Centro de Edafología y Biología Aplicada del Segura (CEBAS-CSIC). (2) CEBAS-CSIC, Murcia, Spain. (3) CEBAS-CSIC, Murcia, Spain. (4) CEBAS-CSIC, Murcia, Spain

Correspondence e-mail: [iprietoaguilar@gmail.com]

Leaf litter traits, microbial composition and environmental conditions are important factors driving litter decomposition. Changes in these factors in response to climate change could alter C and nutrient cycles in semi-arid ecosystems, thus increasing their vulnerability. We conducted a manipulative field experiment in a semi-arid ecosystem in central Spain dominated by *Helianthemum squamatum* shrubs. We simulated future climatic conditions and assessed the direct effects of warming (W, 2.7°C), rainfall reduction (RR, 30%) and their combination (W+RR) on litter decomposition rates, and their indirect effects through climate manipulation-induced changes in leaf litter traits and microbial biomass. Direct effects were evaluated using a common litter substrate (litter from control plants under current ambient conditions) incubated inside treatment plots. We also incubated leaf litter from the W, RR and W+RR treatments in control plots (trait and microbial effects) and in their own manipulated environment (trait, microbial and environmental effects combined). Leaf litter traits, mainly lignin content, and microbial and fungal biomass drove litter decomposition under common environmental conditions. Additionally, control leaf litter decomposition rates in W and W+RR plots were 16% and 14% lower, respectively, pointing out to a strong negative effect of high temperatures. Similar patterns were observed with original leaf litter incubated in situ pointing out to environmental effects overruling trait and microbial effects. In a concurrent study, we observed reductions in topsoil labile C and N contents in W and W+RR plots, which may be explained, among other factors, by the observed lower decomposition rate of leaf litter under warming.

Sp.02-22-Oral

Structural and functional responses of fungal communities to biotic and abiotic factors in Mediterranean pine forestsRincón Herranz, A.¹, Zabal-Aguirre, M.², Flores-Renteria, D.³, González-Martínez, S.C.⁴, Buée, M.⁵, Pérez-Izquierdo, L.⁶

(1) Instituto de Ciencias Agrarias (ICA-CSIC). (2) Instituto de Ciencias Agrarias ICA-CSIC. (3) Museo Nacional de Ciencias Naturales MNCN-CSIC. (4) 3INRA, UMR 1202, BIOGECO-France. (5) UMR-INRA-UL. Centre Nancy-France. (6) Instituto de Ciencias Agrarias ICA-CSIC

Correspondence e-mail: [ana.rincon@csic.es]

Fungi are key actors in forest ecosystems involved in nutrient biogeochemical cycling and tree's productivity. However, to what extent the surrounding environment affects fungal communities is still poorly understood. This work aimed to study the impact of biotic (tree genotype) and abiotic (season, site) factors on the diversity and assemblage of fungal communities, and to explore the potential derived functional consequences. We performed a high-throughput sequencing approach combined with enzymatic tests and soil analyses to study the fungal communities associated with different genotypes of *Pinus pinaster* in ~50-yr-old plantations. The tree genotype and spatial-temporal factors were crucial structuring fungal communities mainly influencing their assemblage and filtering certain fungi, particularly ectomycorrhizal ones. Site dependent responses of fungi related with the tree genotype raised. Diversity variations in total community and/or in that of specific fungal guilds, together with edaphic properties and the productivity of trees, explained activities involved in carbon turnover and phosphorous or nitrogen mobilization. Our results reveal that structural shifts in fungal communities produced by biotic and abiotic factors can affect relevant ecosystem processes, which can have essential implications for the resilience of Mediterranean forests under future climate change scenarios.