

Changes in climate cause important functional changes at the soil fungal community

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Changes in soil climate can regulate fungal community composition and structure in Mediterranean forests. Here, we studied spatio-temporal changes of the soil fungal communities in a Mediterranean *Pinus pinaster* forest and we correlate community shifts with changes in soil moisture and temperature.

Here, we studied the fungal communities in 336 soil samples collected monthly during a year from 28 long-term experimental plots. Fungal community was studied by PacBio sequencing of ITS2 amplicons and standing fungal biomass was quantified by analysing ergosterol. Fungal community was taxonomically described at species, functional and fungal trait level.

Summer months and late winter registered the lowest soil fungal biomass whereas autumn registered the greatest biomass, coinciding with a greater relative abundance of mycorrhizal species. Spatio-temporal changes in community composition correlated significantly with changes in soil moisture and temperature. Relative proportions of mycorrhizal fungi were increased under drought conditions, in comparison with free-living fungi. Mycorrhizal species with short distance exploration type increased in relative abundance under dry conditions, whereas species with long exploration type were more abundant under wetter conditions.

We show compositional and functional changes in fungal communities correlated with changes in climatic conditions. Free-living fungi could be negatively affected by increasing droughts in Mediterranean forest ecosystems.

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