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The rhizosphere microbiome of cork oak

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Forests are a source of energy, materials and food and they play an important role in carbon storage, biodiversity conservation and climate regulation. Although resilient in surpassing disturbance episodes, cork oak forests have been declining due to the complex combination of biotic and abiotic factors. This finding compromises the socioeconomic value of cork as well as the unique biodiversity harbored in Mediterranean forests. From leaves to roots, trees host a high diversity of microbial communities. Particularly, the rhizosphere microbiome has a key role in the biogeochemical cycles, nutrition and tree health. However, little is known about the microbiome that inhabits the cork oak roots compared to other tree species. The RhizoCork project aims to characterize the rhizosphere microbiome of cork oak to unravel important microorganisms for tree health, growth and productivity. In this ongoing project, rhizosphere soil samples were already collected from healthy and declined cork oak trees and high-throughput sequencing has been used to characterize both cultivable and uncultivable bacteria and fungi. The results showed that healthy and declined trees had significantly distinct bacterial and fungal communities, supporting the hypothesis that different tree health status harbor different microorganisms. The results motivate further studies to understand the microbiological factor associated with forest health status. The RhizoCork project is focused on developing new forest management strategies that comprise a microbiological component to overcome the factors that trigger forest decline.

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