



*Soil Biodiversity And Ecoregions –
Mediterranean Forest, Woodland
And Shrubland – Part 1*

Patchy, hot and rainy. Mediterranean environments include forest, shrubland, grassland and ‘badland’ (including arid and semi-arid) habitats, with some exceptions. In fact, the combination of many adjacent habitats gives Mediterranean landscapes a distinctive transitional as well as patchy structure, which results in a characteristic diversity of plant and animal populations. Five regions in the world are considered Mediterranean-type ecosystems; the Mediterranean Basin, central Chile, southern and central California, the Cape Province of South Africa and two parts of southern Australia in the centre and the west. Similar climate patterns, with dry and hot summers and rainy winters and the common proximity of marine and arid biomes, provoke clear cases of species convergence. However, a different biogeography and history of disturbances (principally fire and land exploitation) generate differences at the community level among these areas.

Soil types vary among regions due principally to differences in the underlining parent material; in the Mediterranean Basin this is basically limestone, which is reduced to strips in South Africa and Australia, and does not exist in Chile and California. In any case, due to the strong seasonal contrast, Mediterranean soils share a modest profile development, which tends to decrease with increasing elevation. All regions present a mosaic of old and newer soils, showing a general scarcity of nutrients and low water content. This mosaic is accentuated due to the formation of ‘fertility islands’, created by trees, shrubs or even faunal structures, such as ant mounds, in a matrix of almost bare soil. In these islands, plant structure and resources and the biology of the associated soil fauna create very different soil microhabitat conditions between the islands and the matrix and among different types of islands. In general, litter and soil compartments are much more differentiated than in other ecosystems, and the tenuous intermediate phase between them gets thinner from mesic to arid environments.

Although there is a common resemblance among aboveground plant parts such as evergreen plants, root systems are more variable depending on soil and rock conditions. Some widespread adaptations of roots to desiccation and the lack of nutrients in Mediterranean-type ecosystems are: the persistence of the primary root, deep penetrating roots in woody plants while the roots of some succulent plants extend horizontally over wide areas, seasonal variations in the vertical root structure by root contraction or fine-root turnover, and associations with actinobacteria and mycorrhizal fungi. In fact, mycorrhizae have been mentioned in numerous studies as being crucial components of the root system in Mediterranean ecosystems, especially in semi-arid and arid environments. Another important structural component of some Mediterranean soils is the existence of biological soil crusts, which seem to play a fundamental role in soil resistance to erosion.

Soil biodiversity. Microbial communities are principally associated with the rhizosphere and are subjected to seasonal variations in density. Microbiological activity, including carbon emissions, is overall low. Both bacterial and fungal communities show great differences among litter and soil levels, while seasonal variations in community structure are higher in the litter layer than in the mineral soil. The bacterial-to-fungal proportion decreases with increasing aridity, indicating the important role of fungi in the decomposition process of Mediterranean-type ecosystems.

To be continued...

Soil Lovers say: Diversity And Commonality In These 5 Mediterranean Areas Must Be Recognised.

Ref: A Global Atlas of Soil Biodiversity p83

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