



Metabolic activity and functional biodiversity of mediterranean sandy soils as influenced by soil development stage and plant cover

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Decomposer soil microorganisms mineralize organic matter and control nutrients cycling and their availability to plants. It is well established that the availability of organic C regulates the turnover and the activity of heterotrophic microbial communities in soils (Jenkinson and Ladd, 1981; Wardle, 1992; Sparling, 1997). Besides the functional capability of the soil is related to microbial diversity. Measuring species richness and evenness in soil microbial communities is a very difficult task (Giller et al., 1997; Othonen et al., 1997; Wardle and Giller, 1997). According to Zak et al. (1994) the functional diversity may provide a practical and ecologically relevant measure of microbial diversity. The method of Degens et al. (2000) allows the assessment of microbial catabolic evenness by measurement of the short – term respiration response of soil to the addition of 25 different simple organic compounds. We applied this method to assess: 1) the relationships between microbial diversity and soil development stage and plant cover, 2) the relationships between microbial diversity and the pool of organic C in the soil.

Two different study areas were studied: Vesuvio National Park (Naples) and Castel Volturno Nature Reserve (Northern of Naples). In the first area we studied: a) *Gran Cono* soils on the eastern side of the Vesuvio crater on a steep slope; such soils are characterized by a rough texture and are covered by pioneer vegetation; b) *Atrio del Cavallo* soils, originated from pyroclastic material of the last eruption (1944); such soils with moderately rough texture had been reafforested in the decade 1965 – 1975 with *Pinus nigra* Arn. and *Robinia pseudo – acacia* L.

In the Castel Volturno Nature Reserve area we analysed a deep sandy soil under a typical mediterranean maquis prone to frequent fires.

The results show that *Gran Cono* soils have a very active microflora, a fast matter's cycle and a low accumulation of organic matter, due both to a poor plant cover and to a rapid mineralization of the organic matter. *Atrio del Cavallo* soils have a less active microflora, a more recalcitrant organic matter produced by litter decomposition. In spite of the high content of organic matter *Castel Volturno* soils are characterized by relatively low microbial biomass and metabolic activity.

The catabolic evenness, independently of the size of available resources is low in all the studied soils and the smallest value occurs just in the soil with the higher organic matter content.