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EXTENDED ABSTRACTS

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DISCRIMINATION OF SOILS UNDER DIFFERENT MEDITERRANEAN SHRUB SPECIES IN RELATION TO BIOCHEMICAL PARAMETERS

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Introduction

Taking into account that the major part of organic matter and nutrient transformations in soil are microbially mediated (Swift et al. 1979), the structure of microbial biomass and its activity need to be considered when assessing the nutrient status of an ecosystem.

Our aim was to investigate whether shrubs belonging to different species create discernable soil microhabitats, in terms of the biochemical parameters recorded at the upper soil layer (upper 5 soil cm under the litter) below their canopy.

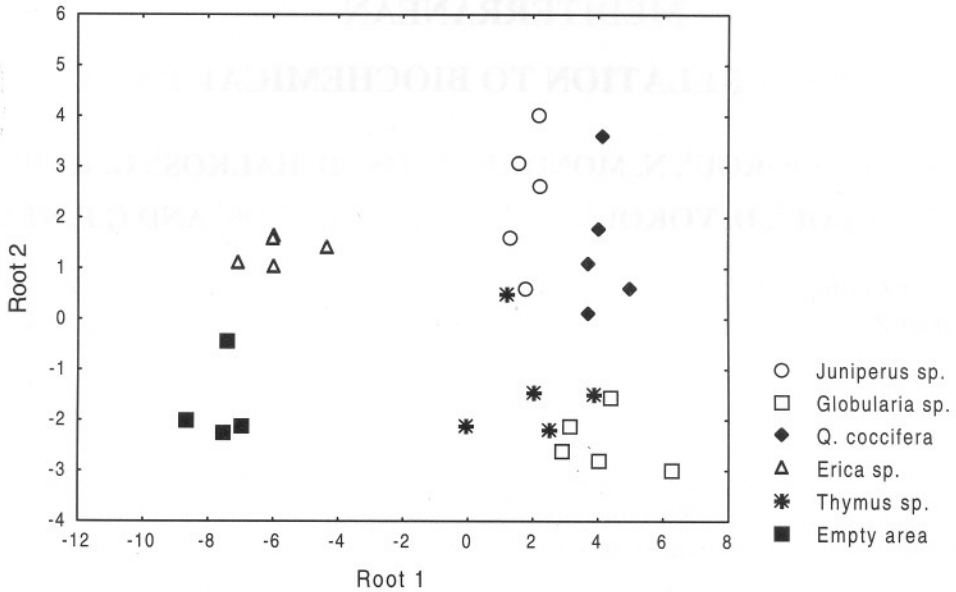
Materials and Methods

Soil under the canopy of five characteristic of the Mediterranean ecosystem shrub (*Juniperus* sp., *Quercus coccifera*, *Globularia* sp., *Erica* sp. and *Thymus* sp.) as well as the between shrubs empty area was sampled in mid-September 2000. In each sampling area five replicates were collected. The soil was analysed for C-microbial (method of Jenkinson & Powlson 1976 with the modifications recommended by Ross 1990), CO_2-evolution at 10°C, fungal biomass by measuring ergosterol (method of Djajakirana et al. 1996), bacterial substrate utilization (used as an index of bacterial activity) at 28°C for 120 h, by using GN Biolog plates (a modified BIOLOG assay; Vahjen et al. 1995), rate of C-mineralisation at 28°C, C-organic, N-organic and N-inorganic (NH_4 and $N0_3$).

Results and Discussion

From the analysis of data concerning bacterial activity and biomass (mean utilization per substrate group, total utilisation per plate, diversity and evenness indices), follows that the ability of the bacterial community to metabolise carbon compounds is not differentiated among the sampling sites. Considering evenness (mean value 0.78), it can be inferred that the bacterial community exhibit no trophic specialization. Moreover, on average higher metabolic activity in comparison with similar data from a more xerophytic Mediterranean area (Ekschmitt et al. 1999) was recorded. In all probability the increased bacterial activity under higher temperature and low soil humidity (7-8%) conditions might be associated with resistant to water stress Mediterranean microflora (van Gestel et al. 1993).

Fig. 1. Discrimination of the sampling areas according to the soil biochemical parameters with the exception of bacterial substrate utilisation.



Since the bacterial substrate utilisation proved not valuable index for the discrimination of the sampling sites, the discriminatory capacity of the rest parameters are examined. According to fig.1, a statistical significant discrimination is achieved based on the values of fungal biomass, N-organic and C- microbial. The first root represents a fungal biomass gradient (increasing from left to the right end point of the first axis) while along the second axis the concentration of the other two parameters increases from the bottom to the upper part of the diagram. So, lower fungal biomass separates samples from *Erica* sp. and the empty area from the others, while samples from *Globularia* sp. and *Thymus* sp. are distinguished from those taken under *Juniperus* sp. and *Q. coccifera* in accordance to concentrations in organic N.

Above data allows to conclude that only fungal biomass is a reliable index for the identification of different soil microhabitats in an Mediterranean autumn sampling.

Acknowledgements

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