

Effect of organic fertilizers on genetic and functional diversity of soil micro-organisms

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National organizations are appealed to Agriculture in order to contribute to recycling organic matters like green waste compost and sewage sludge. The use of those organic matters in agriculture implies a better knowledge of the impact of those practices on soil microbial ecology. In published works, differences in organic matters amount and in methods used to observe soil microbial population make it difficult to conclude about farming practices consequential effects on soil microbial communities. The aim of this study is to observe the influence of different organic amendments on soil microbial communities during the two years after spreading.

The study site, located in north-west of France is composed of four cultivated parcels that respectively receive four different organic amendments (sewage sludge, compost, poultry manure and composted sewage sludge) versus a reference that only receives an inorganic fertilizer. After spreading, microbial communities are analysed in the first 10 cm of the soil during a kinetic experiment of two years..

Microbial biomass has been estimated by (1) enumeration of cultivable bacteria (2) quantification of microbial carbon after fumigation-extraction, (3) quantification of total DNA extracted and its diversity evaluated by metabolic profiles (Biolog system) and genetic fingerprints analyses. Results obtained concern the 24 first months after spreading of organic matters. In a quantitative point of view, after spreading, a transient increase of biomass is observed during the first three months for each kind of treatment. The genetic diversity is still in process at the present time. The metabolic profiles PCA analysis shows a modifications of the microbial ecosystem structure with a weak increase of metabolic diversity just after spreading, a deep decrease 6 months after and a return to initial state 18 months after. These modifications occurred in every treatment even in the inorganic reference.