

Microbial properties in European arable soils with different tillage systems

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Introduction

Microbial biomass and its activity are considered to be sensitive indicators of changing conditions in soil, because they react faster to changes than soil organic carbon (SOC). Agricultural management practices, such as the intensity of tillage, can alter microbial properties. The underlying mechanisms that lead to a change in the microbial biomass and its activity are barely understood. This study is about the influence of different agricultural management practices on soil microbial properties. In particular, three different tillage practices (direct seeding (DS; absence of tillage), minimum tillage (MT; non-inversion tillage mostly with a cultivator) and conventional tillage (CT; inversion tillage with a plough)) were investigated. The influences of site-specific factors (climate, texture) were compared with those of agricultural management practices.

Material and Methods

Farmland soils with different management practices were examined in the typical agricultural areas in Sweden, France, and Romania. In Sweden and France the tillage practices CT vs. DS and in Romania CT vs. MT were compared.

Soil sampling was performed under winter wheat in three soil depths (0-10 cm, 10-20 cm, 20-30 cm).

Reduced tillage sites (DS/MT) were not ploughed for at least five years prior to sampling.

SOC was determined by subtracting possibly existing carbonates (determined with Scheibler method) from total carbon (determined by dry combustion).

Microbial biomass C (C_{mic}) was estimated by chloroform-fumigation extraction (Brookes et al., 1985; Vance et al., 1987).

The fungal cell-membrane component ergosterol was extracted (Djajakirana et al., 1996) as a proxy for fungal biomass.

Results

A manuscript is in preparation.

Literature

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