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Cropping system impact on soil quality determinants

Keywords liming, soil property, soil quality indicator, soil resilience,

Abstract

Worldwide interest in soil quality evaluation has increased rapidly throughout the past decade, prompting us to evaluate the lo
of four cropping systems on several biological, chemical and physical determinants of soil quality. We hypothesized that after
several of the determinants would show significant differences between conventional cereal and low input/organic rotations. Fou
rotations were imposed on a silt soil from 1982 through 1999. Rotation A was a conventionally managed cereal rotation that rece
the recommended mineral fertilizer each year. Rotation B was also managed conventionally from 1982 until 1993, although it rece
of the recommended mineral fertilizer. From 1994 through 1999, rotation B was managed as an organic rotation. Rotations C and D
rotations with plant residues returned either untreated (C)or composted (D)from 1982 until 1994.From 1994 through 1999,they wer
organically. Significant decreases in extractable phosphorus (P)and potassium were observed in rotations C and D compared with
presumably because their yearly nutrient inputs were somewhat lower. The amount of soil organic carbon (Corg), soil water hold
the numbers and biomass of earthworms and the microbial biomass carbon and nitrogen were or tended to be higher in low input/or
conventionally managed plots. These effects may be in connection with the slightly increased levels of Corg in soil of the orga
Activities of twelve enzymes were strongly affected by sampling time (early-versus late-summer), but much less by long-term man
decomposition, numbers of soil nematodes, arbuscular mycorrhizal (AM)fungal diversity,AM spore density and AM functioning were
by rotation. However,AM spore density correlated positively with the high amounts of extractable calcium and P which were a res
excessive liming applied to some plots in 1982. The crucial question to be answered in future is whether plant growth and yield
with the changes in soil properties. This question will be dealt with in a further paper using data from the same experiment.

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