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# Synlocation of biological activity, roots, cracks and recent organic inputs in a sugar beet field [α]

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ABSTRACT

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Soil tillage does not lead to homogeneously mixed soil layers. Depending on the interaction between the physical condition of the soil and the tillage implement, a repetitive, layered pattern of accumulated crop residues or other freshly added organic matter can often be observed. Such a non-homogeneous pattern may affect subsequent biological activity, the rates of decomposition, and the chances for root development to occur close to the sites of mineralization in the next growing season.

Patches of organic matter, soil cracks and roots were mapped on clear plastic (polythene) sheets on a soil profile wall. Maps were analysed for spatial correlation of the various mapped items. Small samples of the patches of crop residues and freshly added organic matter, and of surrounding (control) soil were analysed for the abundances of bacteria and protozoa.

A statistical test for synlocation of roots and cracks was developed, on the basis of measured root densities as a function of the distance to the nearest crack. A significant increase of root density (by a factor two) close to the crack was found. For organic matter patches a similar synlocation with cracks was indicated.

Patches with freshly added organic matter contained twice as many bacteria and five times as many protozoa as the control soil. Patches with recent crop residues contained four times as many protozoa, but equal densities of bacteria as control soil. Only a small part of the spatial variability in the abundance of soil organisms, encountered when using a random sampling scheme, is accounted for by distinguishing these patches. Nevertheless, knowledge of the location and activity of these "hot spots" may help in understanding the process of decomposition. The present data indicate a certain degree of synlocation of roots and sites of increased n mineralization, but its effect on plant nutrition and on N use efficiency is probably small.

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