

SOIL BIOLOGICAL QUALITY AFTER 17 YEARS OF CONTINUOUS MAIZE CROPPING WITH AND WITHOUT COVER CROP AND TWO LEVELS OF ORGANIC FERTILISATION

VAN EEKEREN, NICK¹ (N.VANEEKEREN@LOUISBOLK.NL); VAN SCHOOTEN, HERMAN²; SCHOUTEN, TON³; BLOEM, JAAP²

¹Louis Bolk Institute, The Netherlands

²Wageningen University, The Netherlands

³RIVM-Lab for Ecological Risk Assessment, The Netherlands

It is well documented that soil biological quality is low in continuous arable cropping compared to permanent grassland or a ley-arable crop rotation. The use of cover crops and organic fertilisation are potential measures to counteract the impoverishment of soil quality. Effects of these treatments were investigated in a 17 year old experiment with continuous maize cropping on a podzolic sandy soil, by measuring a broad range of soil biological parameters. In general, the levels of C and N-mineralisation were low but comparable to other arable fields with continuous cropping. Fungal biomass and bacterial biomass and growth rate were not significantly affected by the treatments. Both potential C-mineralisation and potentially mineralisable-N increased significantly with fertilisation level. Potential C-mineralisation was also higher with the cultivation of a cover crop. Potentially mineralisable N was positively correlated ($r=+0.89$) with the dry matter yield of the maize. Total number of nematodes was as low as in other experiments with continuous cropping. The nematode community composition was not significantly affected by the treatments, only the cp1-group percentage of nematodes was significantly higher with the fertilisation level. The total number of nematodes was positively correlated ($r=+0.90$) with dry matter yield of maize. Earthworm abundance was very low and not affected by the treatments. We conclude that soil biological quality of continuous maize cropping on a poor sandy soil cannot substantially be improved by a cover crop or organic fertilisation. To recover the soil biological quality, either a ley-arable crop rotation should be practised or direct sowing techniques with minimal tillage could be used.