

Effect of soil chemical, structural and microbial properties on ciliate population in a slurry-applied upland soil

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To clarify the effect of organic material application over 20 years on protozoan populations, we examined soil structural and chemical properties, microbial biomass with the fumigation–extraction method, and ciliate viable count with a modified MPN method (MPN-SIPs: most probable number with species identification and population size estimation; Takahashi et al, 2005) in upland soils with different levels of cattle slurry application. The soil chemical and structural properties differed significantly between the bare plot and the 60, 150 and 300 ton fresh-slurry per hectare plots. The microbial biomass increased with the level of slurry application. The bulk density and the electrical conductivity significantly correlated with the protozoan population. The maximum water holding capacity significantly correlated with the microbial biomass. There was no significant relationship between the protozoan population and the microbial biomass. The above results suggest that slurry application to upland soil affects the protozoan population via soil chemical and structural properties.