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Continuous application of different fertilizers induced distinct bulk and rhizosphere soil protist communities

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Soil protists, a critical component of soil microbiome and useful bio-indicators for soil quality, are constantly overlooked in field soils, thus investigation of this important group will bring unpredictable contribution to agriculture industry. In this study, long-term field experiment with cucumber monoculture was adopted to disentangle the influence of *Trichoderma* enriched bio-fertilizers and organic fertilizers on soil protist community, compared with chemical fertilizers without extra microbial inoculation through the Illumina HiSeq sequencing. Results showed application of chemical fertilizers revealed lower protist richness and diversity than organic fertilizers and bio-fertilizers in both bulk and rhizosphere soils. Bray-Curtis distance principal coordinate analysis revealed significant differences in bulk and rhizosphere soil protist community structures, and the structures of chemical fertilizers were obviously separated from organic fertilizers and bio-fertilizers in both bulk and rhizosphere soils. Moreover, in bulk soils, organic fertilizers had the higher relative abundances of Alveolata, Amoebozoa, Archaeplastida and Opisthokonta than chemical fertilizers and bio-fertilizers. Compared to rhizosphere soils, Alveolata and Amoebozoa increased in bulk soil from chemical fertilizers, while the later one decreased in organic fertilizers. In addition, top 50 protist OTUs were assigned into functional groups, and OTU_144 *(Acanthamoeba arachisporum)* increased and OTU_54 (Hypotrichia: belonging to Omnivores) decreased from bulk to rhizosphere soils in all treatments. In sum, we concluded that field soil persistent management such as organic fertilizer and bio-fertilizer application could greatly alter bulk soil protist community and plant could further select protist community in the rhizosphere, which might be related with plant health and plant growth in the agriculture system.

Biography

Sai Guo is a PhD student in soil microorganism and bio-organic fertilizer research innovation team of Nanjing Agriculture University, China. His supervisors are professor Qirong Shen and associate professor Rong Li. Dr Sai Guo has her expertise in soil microorganism ecology and interaction mechanism between microorganism and plants. He specializes in high-throughput data analysis of soil bacteria, fungi and protozoa. He and His team have been committed to improving the quality of Chinese soil arable land and rationally using bio-organic fertilizers to regulate the activity of soil microflora in the rhizosphere.

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