Guozhong Lyu et al., J Ecosyst Ecography 2017, 7:2 (Suppl)
DOI: 10.4172/2157-7625-C1-029

Insight into the diversity of soil fungi in Changbai mountain by high-throughput sequencing

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Soil fungi are an important group of microorganisms in forest ecosystem, they play pivotal roles in cycling of organic compounds and further affect the below-ground and above-ground ecosystems. In contrast to soil bacteria, soil fungi have been poorly understood in forest ecosytem. The rapid development of molecular technologies offers an effective method to access more functional information on soil fungal diversity. We applied the technique of Illumina Miseq High-Throughput Sequencing to investigate the soil fungal diversity and community structures in the northern slope of Changbai Mountain, Jiling Province, China, which is characterized with an evident vertical vegetation distribution pattern along with the altitude. The metagenome sequence analysis was conducted by targeting ITS1f-ITS2 fragments for 80 soil samples collected in the four characteristic forest vegetation bands ranging from the root of 700 m to the top of 2600 m in altitude, it reveals a tremendous abundance of soil fungi in Changbai mountain forest. Totally 2,294,552 rDNA fragments of reads are grouped into 25,282 operational taxonomic units (OUTs), they belong to 1056 species, 622 genera, 195 families, 87 orders, 24 classes and 5 phyla of fungi. Among which 182 genera are of *Basidiomycota* (48.72%), 411 genera of *Ascomycota* (31.67%), 13 genera of *Zygomycota* (10.21%), 13 genera of *Chytridiomycota* (0.27%), 3 genera of *Glomeromycota* (0.04%), and the left 9.09% are unclassfied taxa. The species of *Basidiomycota* are the predominant compents of the soil fungi in the mountain, especially the genera of *Laccaria* (6.17%), *Inocybe* (5.54%), *Hygrocybe* (3.06%), and *Russula* (2.37%) of Agricales. While the genera of *Mortierella* (6.73%) and *Inocybe* are most widely distributed in all altitude sampling soils in the mountain. The soil fungal richness evidently tends to decrease from the root to the top of the mountain, and the fungal compositions vary in the four characteristic vegetation bands of the mountain. The novel profile of soil fungi in the mountain uncovered by means of metagenome technique could not be obtained by conventional fungal research methods.

Biography

Guozhong Lyu has completed his Ph.D from Shenyang Agricultural University. He is the Dean of College of Environment and Resources, Dalian Nationalities University, China. He has published 150 papers mainly about fungal biodiversity, plant diseases and biocontrol of invasive weeds in academic journals.

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