

Structures and metabolic potentials of fungal community in Mangrove sediment in China

Zhi-Feng Zhang^{1*}

Southern Marine Science and Engineering Guangdong Laboratory (Guangzhou)

*Corresponding author, e-mail: zhangzhif0371@163.com/zhangzf@gmlab.ac.cn

ABSTRACT:

Mangrove wetlands are widely distributed along the coast in tropical and subtropical regions with specific environmental features, where there may survival a variety of adopted microorganisms. While fungi are key components of microbial community with important ecological functions, the fungal community and their metabolic potentials in mangroves remain generally elusive. To address these gaps, amplicon and metagenomic methods were applied to systematically analyze the structure, biogeography, assembly and metabolic potentials in seven representative mangroves across Eastern to Southern China.

The analysis recovered a high level of fungal diversity, including a number of basal fungal lineages not previously reported in mangroves, such as *Rozellomycota* and *Chytridiomycota*. β -NTI analyses suggested a determinant role of dispersal limitation on fungal community in overall and most individual mangroves, with supporting from the strong distance-decay patterns of community similarity. NMDS analyses revealed a similar biogeography of dominant and rare fungal community. A minor role of environmental selection on the fungal community was noted, with geographical location and sediment depth as crucial factors driving the distribution of both, the dominant and rare taxa. For metagenomic analysis, a hybrid assembly based on Illumina and Pacbio sequencing was adopted. Even so, we still could not retrieve high quality fungal genomes. Therefore, metabolic potentials of fungal community were investigated in contig level. With discovery of some important genes and pathways, we proposed that fungi therein may involve in degradation of various carbohydrate and peptide substrates, and may participate in nitrogen and sulfur cycling. The study expands our understanding of the fungal community and their possible roles in nutrient and energy cycling in mangroves.

KEYWORDS:

Fungal community; ecological processes; metabolic potential; metagenome; mangrove wetland.