

NEUTRAL PROCESSES AND SALINITY SHAPE MICROBIAL COMMUNITY ASSEMBLY IN MANGROVE ECOSYSTEMS ALONG ESTUARY

Lu Liu*, Nan Wang, Min Liu, Suhua Shi, Zixiao Guo

State Key Laboratory of Biocontrol, Guangdong Key Lab of Plant Resources,
Southern Marine Science and Engineering Guangdong Laboratory (Zhuhai),
School of Life Sciences, Sun Yat-Sen University, Guangzhou, Guangdong, China
lssssh@mail.sysu.edu.cn (Suhua Shi)

Mangrove ecosystems are important because they protect coasts, provide sheltering for coastal populations, and sequester carbon. Mangrove forests at different sites along an estuary from downstream region to upstream region are usually featured with different plant communities, due to the gradient of salinity and tidal inundation. We want to know whether the microbial communities also vary along an estuary and what mechanisms shape the assembly of microbial communities in mangrove ecosystems.

We compared samples collected from three mangrove species at three different locations along an estuary on Hainan Island, China. We found significant differentiation in the diversity and assembly of microbes among the three locations, as well as between rhizosphere and bulk sediments. Neutral processes have played dominant and niche-based processes have played minor roles in shaping the assembly of rhizosphere microbial communities in mangrove ecosystems. Physicochemical conditions, particularly salinity, underlie the niche-based process leading to a decline in microbial diversity and microbial network stability from the upstream region to the downstream region. However, the species identity of the host plant has only a weak influence on the assembly. Particularly, rhizosphere sediments in downstream environments are prone to the enrichment of more microbes associated with organic matter degradation (e.g., Bacteroidetes) and sulfur cycling (e.g., Deltaproteobacteria), which are likely related to carbon sequestration.

We conclude that the assembly of microbial communities in mangrove ecosystems differed along an estuary, which is dominated by neutral processes and contributed minorly by the gradient in physicochemical conditions.