

Mangroves in a Changing World: Biogeography and Ecological Genomics of Southeast Asian Mangroves

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Mangroves are one of the most threatened ecosystems in the world. Understanding the drivers and limitations of gene flow, phylogeography, genetic adaptation and tools for natural resource management is crucial to effectively address the threats, conserve the long-term evolutionary potential, and ensure the sustainable management of mangroves. The first part of this talk summarizes key research findings on the biogeography of major mangrove tree species in Southeast Asia and the greater Indo-West Pacific region. In essence, propagule dispersal capabilities, land barriers and ocean currents are drivers of gene flow and underscores the importance of long-distance dispersal in connecting fragmented mangrove populations. The second part of the presentation describes our work on abiotic stress response in mangroves, especially at the species range limits. Current understanding of the molecular mechanism underlying stress adaptation points toward diverging strategies in stress response, even among closely related species. These studies will be important in estimating the adaptive potential of mangroves under climate change. The third part of this talk focuses on recent proof-of-concept studies on the application of environmental DNA (eDNA) as a biomonitoring tool in mangroves. Findings showed that fish communities change across the salinity gradient, and that biological invasion is a threat to the mangrove ecosystem. Collectively, these studies highlight the genetic uniqueness in Southeast Asian mangroves, the urgency of their conservation and how recent technological advances can contribute to this cause.

