## Extensive sharing of mitochondrial COI and CYB haplotypes among reefbuilding staghorn corals (Acropora spp.) in Sabah, North Borneo

## ABSTRACT

This study is aimed at establishing a baseline on the genetic diversity of the Acropora corals of Sabah, North Borneo based on variations in the partial COI and CYB nucleotide sequences. Comparison across 50 shallow-water Acropora morphospecies indicated that the low substitution rates in the two genes were due to negative selection and that rate heterogeneity between them was asymmetric. CYB appeared to have evolved faster than COI in the Acropora as indicated by differences in the rate of pairwise genetic distance, degrees of transition bias (Ts/Tv), synonymous-to-nonsynonymous rate ratio (dN/dS), and substitution patterns at the three codon positions. Despite the relatively high haplotype diversity (Hd), nucleotide diversity ( $\pi$ ) of the haplotype datasets was low due to stringent purifying selection operating on the genes. Subsequently, we identified individual COI and CYB haplotypes that were each extensively shared across sympatrically and allopatrically distributed Indo-Pacific Acropora. These reciprocally common mtDNA types were suspected to be ancestral forms of the genes whereas other haplotypes have mostly evolved from autoapomorphic mutations which have not been fixed within the species even though they are selectively neutral. To our knowledge, this is the first report on DNA barcodes of Acropora species in North Borneo and this understanding will play an important role in the management and conservation of these important reef-building corals.