PHYLOGENETIC RELATIONSHIPS AMONG MAHSEERS (CYPRINIDAE) IN MALAYSIA INFERRED FROM SEQUENCING OF A CYTOCHROME C OXIDASE I (COI) MITOCHONDRIAL DNA (mtDNA) SEGMENT

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The present study examines the phylogenetic relationships among Tor douronensis, T. tambra, T. tambroides of the genus Tor and Neolissochilus stracheyi representing the genus Neolissochilus, by using the partial sequencing of the mitochondrial DNA cytochrome c oxidase I (COI) gene. Samples were collected from various rivers throughout Sarawak, Sabah and Peninsular Malaysia. The phylogenetic analysis obtained by using the Neighbour Joining (NJ) and Maximum Parsimony (MP) procedures supported the monophyletic status among the three mahseers, except between T. tambroides and T. tambra. The high genetic divergence separating T. douronensis and T. tambroides or T. tambra confirmed their status as distinct species. Likewise, the high genetic divergence separating the N. stracheyi lineage from the Tor lineages (7.3-11.0%) also supported its recent reclassification from the genus Tor into the genus Neolissochilus. The identical haplotypes found between all the T. tambra sequences with most of the T. tambroides sequences indicated a very close genetic relationship between them. Similarly, the close genetic relationships (0-0.4%) found between T. tambroides samples from Peninsular Malaysia (kelah fish) and those from Sarawak (empurau fish) supported their taxonomic status as belonging to the same species. Phylogenetic analysis also revealed that the T. douronensis mtDNA consisted of three highly distinct lineages (Sabah, northern and southern Sarawak), consistent with their geographical locations. However, our phylogenetic analysis did not find any T. douronensis group to be genetically more similar to T. tambroides (6.3-9.2%). Overall, the present study managed to provide useful insights into the phylogeny and taxonomy of the mahseers in Malaysia.