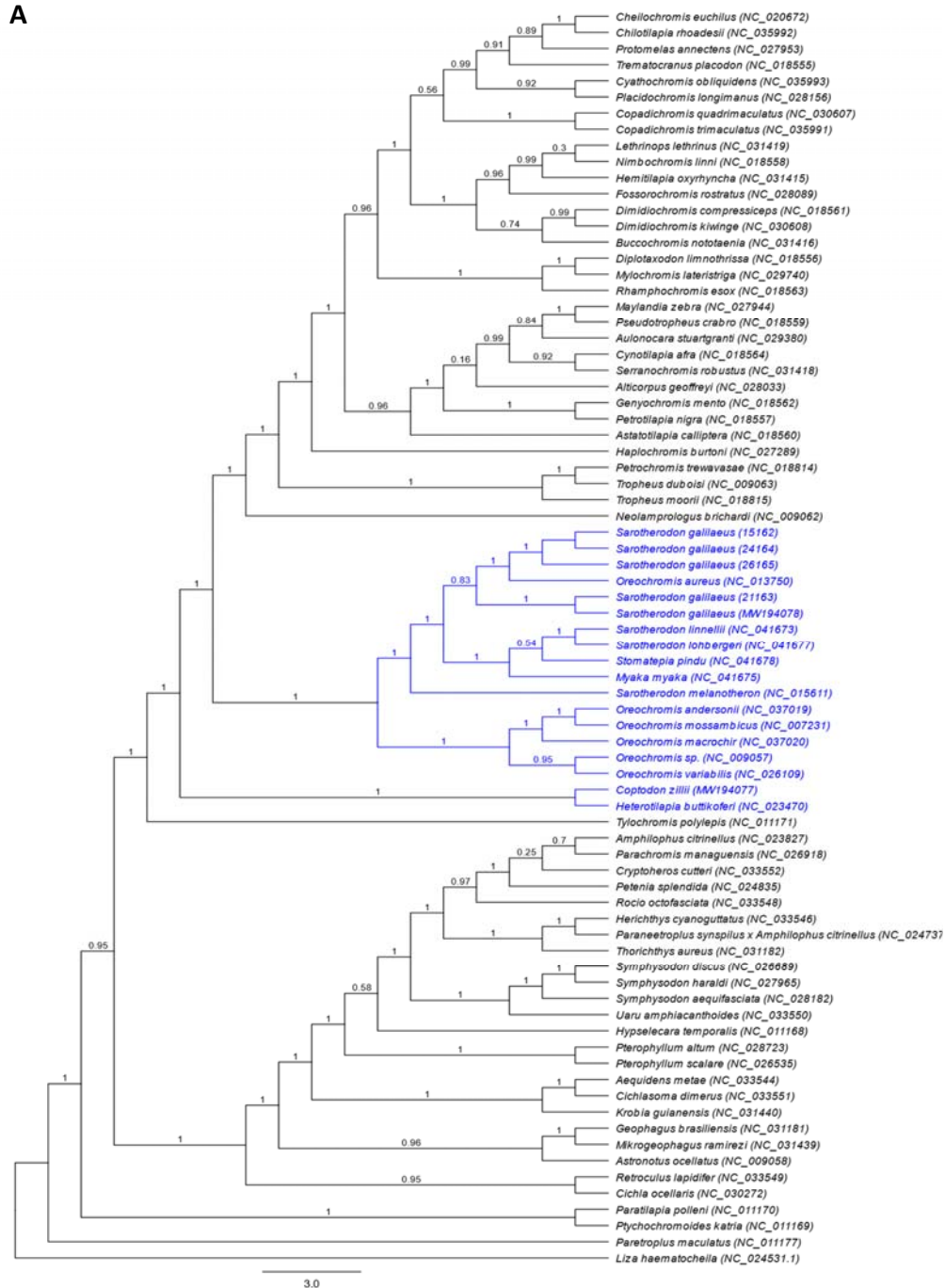
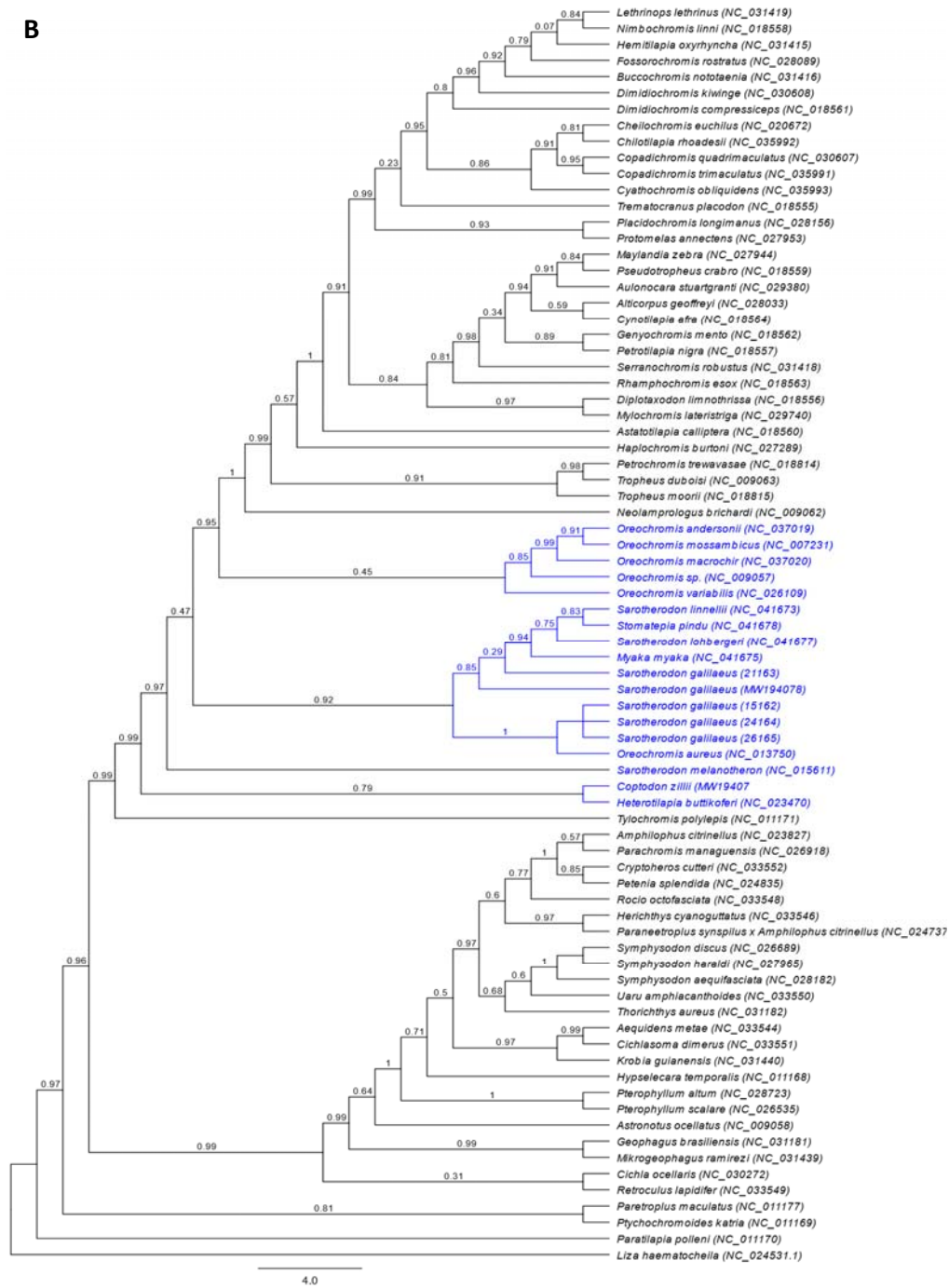


Supplementary Material  
Supplementary Figures



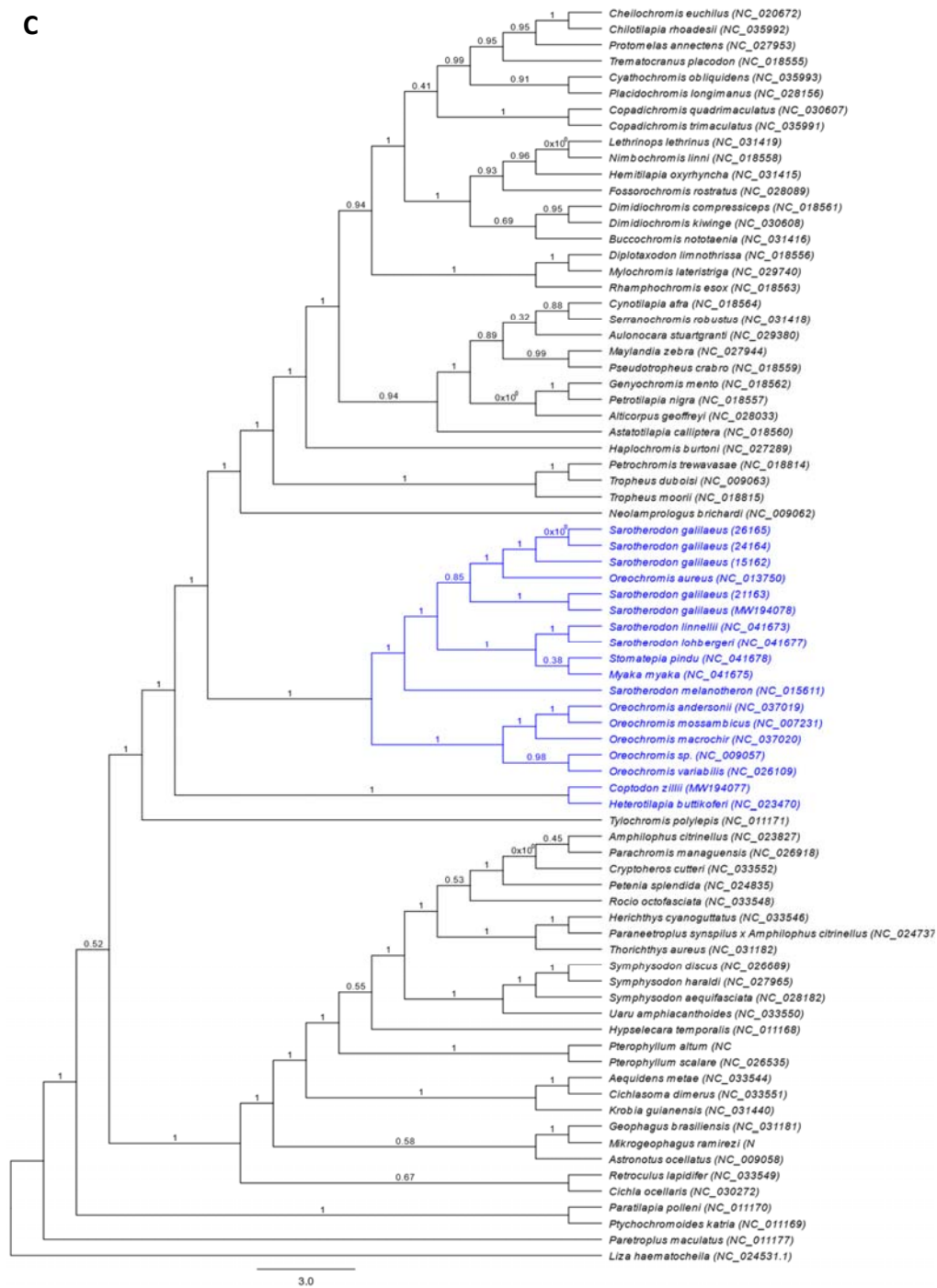
**Supplementary Figure S1.** The phylogenetic trees of cichlid species are inferred based on 78 mitogenomes from the GenBank database and rooted to *Liza haematocheila*. The tree constructs are based on complete mitochondrial genomes (A), tRNAs (B), CDS sequence (C), and IGS region (D) using the maximum likelihood method. The haplotilapiine lineage are together in the same clade, which is represented with the blue color.

**B**



Supplementary Figure S1. Continue

C

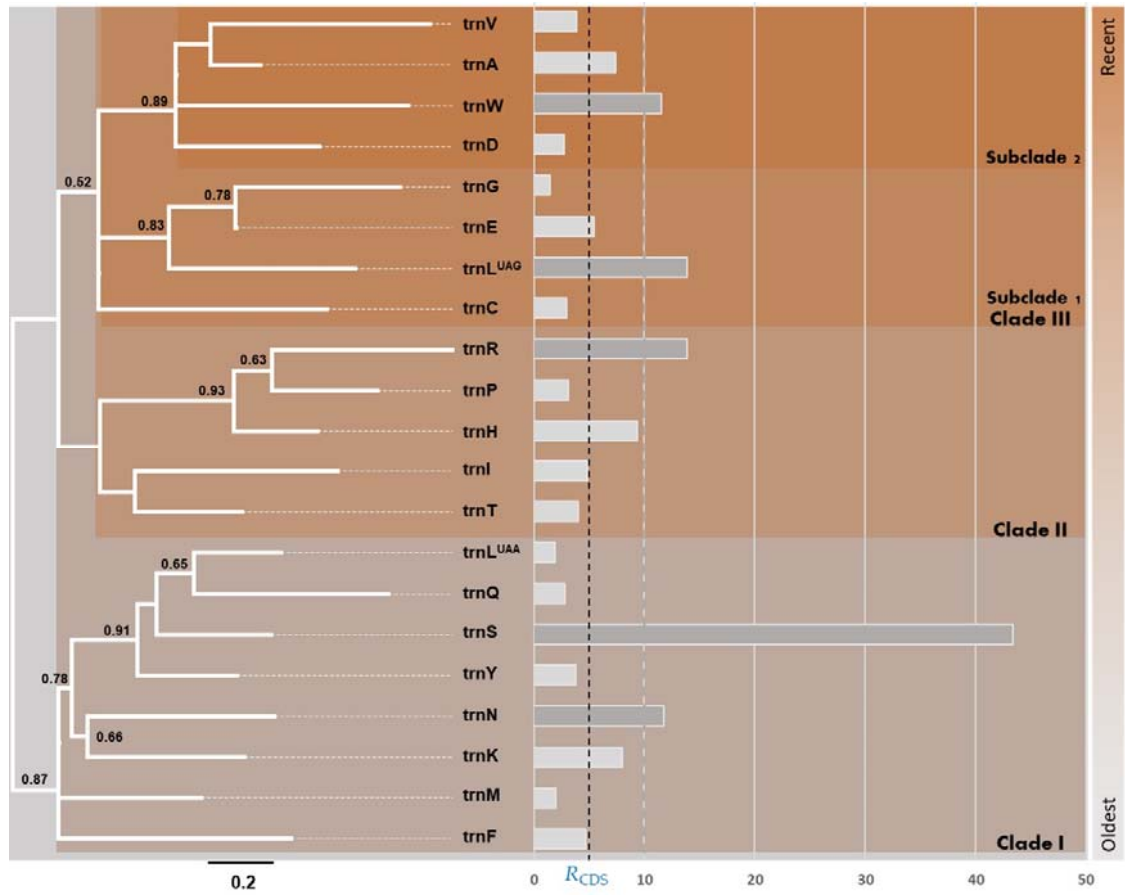


Supplementary Figure S1. Continue

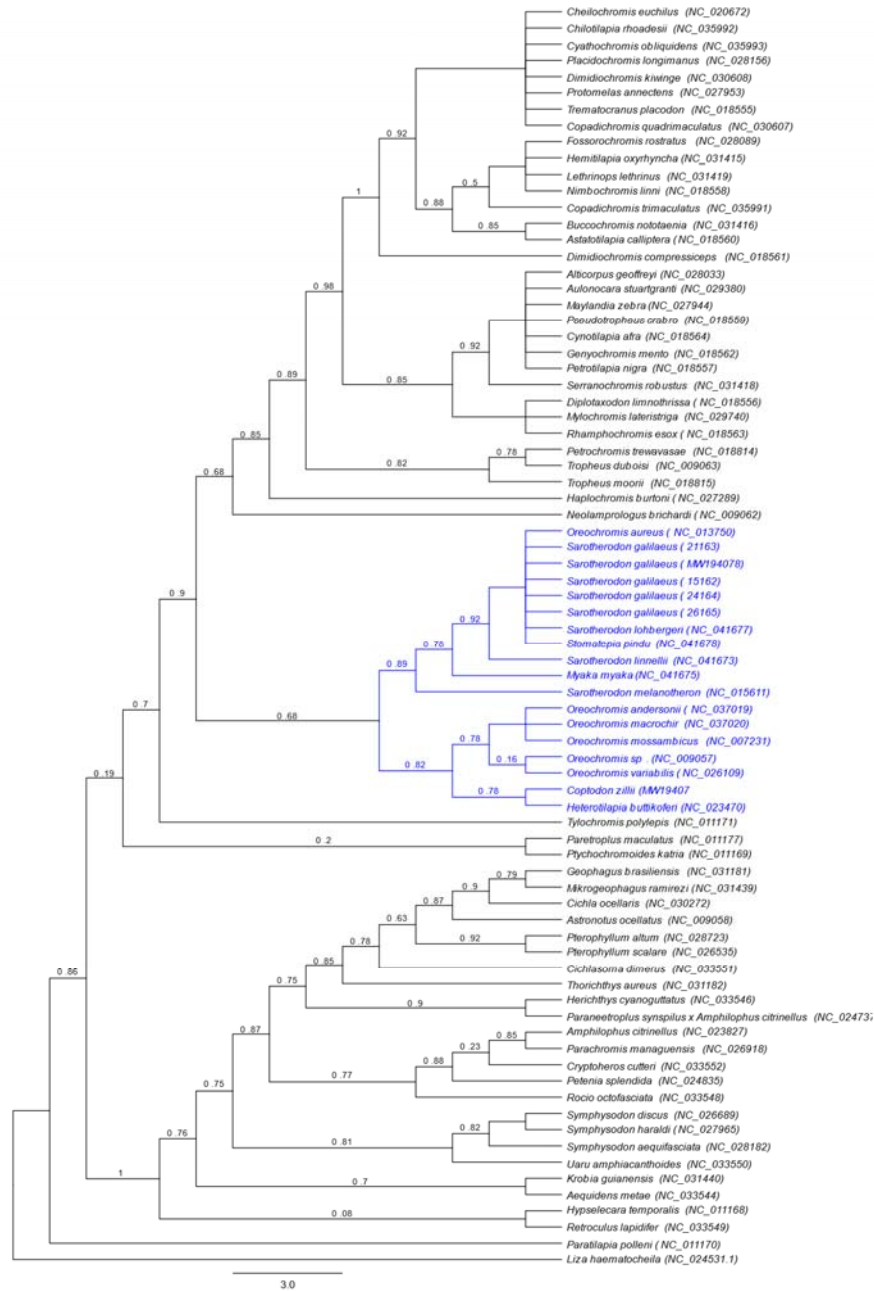
**D**

Buccochromis nototania (NC\_031416)  
Chelochromis euchilus (NC\_020672)  
Chilotiapia rhodesii (NC\_035992)  
Copadichromis trimaculatus (NC\_035991)  
Cyathochromis obliquidens (NC\_035993)  
Dimidiichromis compressiceps (NC\_018561)  
Fossorochromis rostratus (NC\_028089)  
Hemitiapia oxyrhyncha (NC\_031415)  
Lethrinops lethrinus (NC\_031419)  
Nimbochromis linni (NC\_018558)  
Placidochromis longimanus (NC\_028156)  
Protomelas annectens (NC\_027953)  
Trematocranus placodon (NC\_018555)  
Cynotilapia afa (NC\_018564)  
Maylandia zebra (NC\_027944)  
Pseudotropheus crabro (NC\_018559)  
Aulonocara stuartgranti (NC\_029380)  
Serranochromis robustus (NC\_031418)  
Copadichromis quadrimaculatus (NC\_030607)  
Genyochromis mento (NC\_018562)  
Mylochromis lateristriga (NC\_029740)  
Petrotilapia nigra (NC\_018557)  
Diplotaxodon limnothrissa (NC\_018556)  
Rhamphochromis esox (NC\_018563)  
Alticorpus geoffreyi (NC\_028033) - ND1- tm  
Astatotilapia calliptera (NC\_018560) - ND1- tm  
Haplochromis burtoni (NC\_027289)  
Dimidiichromis kivinge (NC\_030608)  
Tropheus moorii (NC\_018815)  
Petrochromis brevipinnis (NC\_018814)  
Tropheus duboisi (NC\_009063)  
Sarotherodon galilaeus (15162)  
Sarotherodon galilaeus (21163)  
Sarotherodon galilaeus (24164)  
Sarotherodon galilaeus (26165)  
Sarotherodon linnelli (NC\_041673)  
Myaka myaka (NC\_041675) - N  
Sarotherodon galilaeus (MV194078)  
Oreochromis aureus (NC\_013750)  
Stomatopoma pindu (NC\_041678)  
Neolamprologus brichardi (NC\_009062)  
Tylochromis polyepic (NC\_011171)  
Copodon zillii (MV194077)  
Heterotilapia buttkoferi (NC\_023470)  
Sarotherodon lohbergeri (NC\_041677)  
Oreochromis andersonii (NC\_037019)  
Oreochromis macrochir (NC\_037020)  
Oreochromis mossambicus (NC\_007231)  
Oreochromis sp. (NC\_009057)  
Sarotherodon melanoteron (NC\_015611)  
Oreochromis variabilis (NC\_026109)  
Aequidens metae (NC\_033544)  
Cichlasoma dimerus (NC\_033551)  
Paretroplus maculatus (NC\_011177)  
Krobia gulianensis (NC\_031440)  
Symphysodon discus (NC\_026689)  
Symphysodon haraldi (NC\_027965)  
Symphysodon aequifasciata (NC\_028182)  
Uaru amphiacanthoides (NC\_033550)  
Rocio octofasciata (NC\_033548)  
Paraneotroplus synspilus x Amphiprophys citrinellus (NC\_024737)  
Thorichthys aureus (NC\_031182)  
Parachromis managuensis (NC\_026918)  
Cryptochromis cutteri (NC\_033552)  
Petenia splendida (NC\_024835)  
Amphiprophys citrinellus (NC\_023827)  
Ptychochromis oides katria (NC\_011169)  
Herichthys cyanoguttatus (NC\_033546)  
Pterophyllum altum (NC\_028723)  
Pterophyllum scalare (NC\_026535)  
Retroculus lapidifer (NC\_033549)  
Mikrogeophagus ramirezi (NC\_031439)  
Astronotus ocellatus (NC\_009058)  
Hypselecara temporalis (NC\_011168)  
Cichla ocellaris (NC\_030272)  
Paratilapia polleni (NC\_011170)  
Geophagus brasiliensis (NC\_031181)  
Liza haematocheilia (NC\_024531.1)

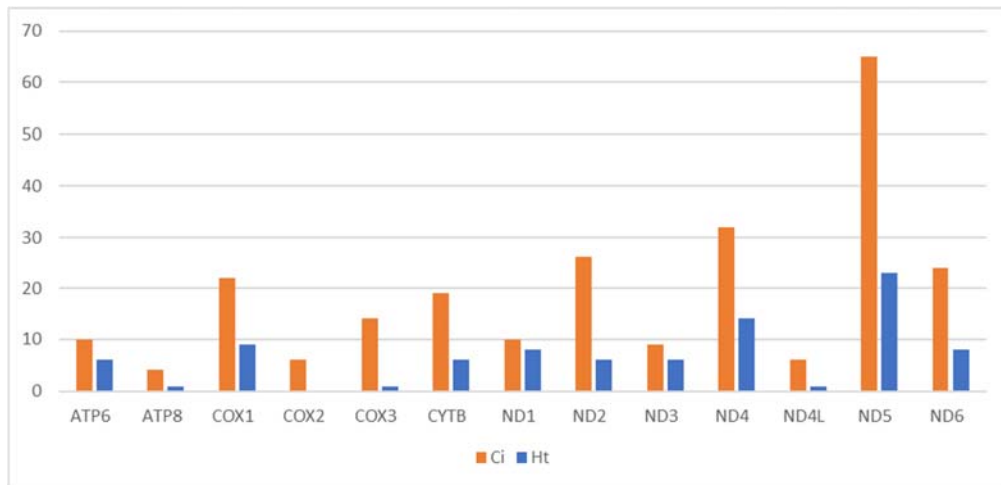
Supplementary Figure S1. Continue



**Supplementary Figure S2.** The phylogenetic tree represents the evolutionary relationship among tRNA genes. The Histogram represents the R values of transition and transversion bias.



**Supplementary Figure S3.** The phylogenetic tree of cichlid species is inferred based on trnI and trnY genes sequences, using the maximum likelihood method and rooted to *Liza haematocheila*.



**Supplementary Figure S4.** The rate of mutations in coding DNA sequence (CDS) region. Both of ND5 and Nd4 record the highest rate of mutation in both cichlids and haplotilapiine lineage.