Table S1 GenBank accession numbers of mitogenomes of 74 species used in this study.

| Genus | Species | Length (bp) | GenBank Accession Number |
|---|---|---|---|
| *Acrossocheilus* | *Acrossocheilus barbodon* | 16596 | NC_022184 |
| | *Acrossocheilus hemispinus* | 16590 | NC_022183 |
| | *Acrossocheilus jishouensis* | 16587 | NC_034917.1 |
| | *Acrossocheilus paradoxus* | 16597 | NC_029453 |
| | *Acrossocheilus spinifer* | 16591 | NC_034918.1 |
| | *Acrossocheilus stenotaeniatus* | 16594 | NC_024934 |
| | *Acrossocheilus wenchowensis* | 16591 | NC_020145.1 |
| *Barbodes* | *Barbodes aurotaeniatus* | 16562 | NC_031619 |
| | *Barbodes binotatus* | 16573 | NC_034755.1 |
| | *Barbodes lateristriga* | 16586 | NC_031588 |
| | *Barbodes semifasciolatus* | 16594 | NC_020096.1 |
| *Carassioides* | *Carassioides acuminatus* | 16579 | NC_031430 |
| *Carassius* | *Carassius auratus* | 16581 | KM659025.1 |
| | *Carassius carassius* | 16597 | JQ911695.1 |
| | *Carassius cuvieri* | 16581 | NC_010768.1 |
| | *Carassius gibelio* | 16581 | NC_014177.1 |
| | *Carassius langsdorfii* | 16578 | NC_002079.1 |
| *Cyprinus* | *Cyprinus acutidorsalis* | 16581 | OQ871460.1 |
| | *Cyprinus carpio* | 16581 | OL699932.1 |
| | *Cyprinus carpio carpio* | 16581 | NC_018035.1 |
| | *Cyprinus carpio haematopterus* | 16581 | NC_018037.1 |
| | *Cyprinus carpio wuyuanensis* | 16582 | NC_018039.1 |
| | *Cyprinus carpio xingguonensis* | 16581 | NC_018036.1 |
| | *Cyprinus megalophthalmus* | 16580 | NC_028417.1 |
| | *Cyprinus multitaeniatus* | 16580 | NC_028419.1 |
| *Hypsibarbus* | *Hypsibarbus salweenensis* | 16588 | NC_031620 |
| | *Hypsibarbus vernayi* | 16590 | NC_031621 |
| *Jinshaia* | *Jinshaia sinensis* | 16567 | NC_024598 |
| *Labeo* | *Labeo altivelis* | 16603 | NC_029444 |
| | *Labeo bata* | 16605 | NC_015193.1 |
| | *Labeo lineatus* | 16606 | NC_022956 |
| | *Labeo pierrei* | 16766 | NC_022943 |
| *Luciocyprinus* | *Luciocyprinus langsoni* | 16586 | NC_066657.1 |
| | *Luciocyprinus striolatus* | 16601 | NC_029436 |
| *Onychostoma* | *Onychostoma barbatulum* | 16597 | NC_021644.1 |
| | *Onychostoma fangi* | 16597 | NC_031529 |
| | *Onychostoma lepturum* | 16601 | NC_054158.1 |
| | *Onychostoma macrolepis* | 16595 | NC_023799 |
| | *Onychostoma meridionale* | 16595 | NC_031603 |
| | *Onychostoma ovale* | 16602 | NC_066040.1 |
| | *Onychostoma simum* | 16601 | NC_021972.1 |

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|---|---|---|---|
| *Poropuntius* | *Poropuntius bantamensis* | 16594 | NC_031604 |
| | *Poropuntius normani* | 16592 | NC_031589 |
| *Procypris* | *Procypris rabaudi* | 16595 | NC_011192.1 |
| *Puntius* | *Puntius eugrammus* | 16847 | NC_031611 |
| | *Puntius sahyadriensis* | 16798 | NC_033916.1 |
| *Sinocyclocheilus* | *Sinocyclocheilus altishoulderus* | 16589 | NC_013186 |
| | *Sinocyclocheilus anatirostris* | 16577 | NC_069226.1 |
| | *Sinocyclocheilus angustiporus* | 16587 | NC_060848.1 |
| | *Sinocyclocheilus bicornutus* | 17426 | NC_031382 |
| | *Sinocyclocheilus cyphotergous* | 16611 | NC_072977.1 |
| | *Sinocyclocheilus furcodorsalis* | 16581 | NC_019995.1 |
| | *Sinocyclocheilus grahami* | 16585 | NC_013189 |
| | *Sinocyclocheilus huizeensis* | 16585 | NC_044072.1 |
| | *Sinocyclocheilus lingyunensis* | 16572 | NC_056143.1 |
| | *Sinocyclocheilus punctatus* | 16582 | NC_058003.1 |
| | *Sinocyclocheilus qujingensis* | 16588 | NC_043910.1 |
| | *Sinocyclocheilus rhinocerous* | 16588 | NC_027168 |
| | *Sinocyclocheilus ronganensis* | 16587 | NC_032385 |
| | *Sinocyclocheilus wenshanensis* | 16595 | NC_060737.1 |
| | *Sinocyclocheilus wumengshanensis* | 16585 | NC_039769.1 |
| *Spinibarbus* | *Spinibarbus caldwelli* | 16545 | NC_022149 |
| | *Spinibarbus denticulatus* | 16549 | NC_021616 |
| | *Spinibarbus hollandi* | 16521 | NC_026129 |
| | *Spinibarbus sinensis* | 16591 | NC_022465 |
| *Thoburnia* | *Thoburnia rhothoeca* | 16626 | NC_031633 |
| *Tor* | *Tor barakae* | 16780 | NC_056296.1 |
| | *Tor khudree* | 16573 | NC_027617 |
| | *Tor malabaricus* | 16580 | NC_036383.1 |
| | *Tor qiaojiensis* | 16590 | NC_066814.1 |
| | *Tor sinensis* | 16579 | NC_022702.1 |
| | *Tor tambra* | 16581 | NC_036511.1 |
| | *Tor tor* | 16554 | NC_027498 |