**TABLE S1.** The mitochondrial genomes sequences used in this study.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Order** | **Suborder** | **Infraorder** | **Superfamily** | **Family** | **Species** | **GenBank accession number** | **Sequence length (bp)** |
| Stomatopoda | Unipeltata |  | Gonodactyloidea | Gonodactylidae | *Gonodactylus chiragra* | DQ191682 | 16,279 |
|  |  |  | Lysiosquilloidea | Lysiosquillidae | *Lysiosquillina maculata* | DQ191683 | 16,325 |
|  |  |  | Squilloidea | Squillidae | *Oratosquilla oratoria* | GQ292769 | 15,783 |
| Euphausiacea |  |  |  | Euphausiidae | *Euphausia pacifica* | EU587005 | 16,898 |
| Decapoda | Dendrobranchiata |  | Penaeoidea | Aristeidae | *Aristeus virilis* | MG582605 | 15,936 |
|  |  |  |  | Benthesicymidae | *Benthonectes filipes* | MF379624 | 17,361 |
|  |  |  |  | Penaeidae | *Penaeus chinensis* | DQ656600 | 16,009 |
|  |  |  |  | Sicyoniidae | *Sicyonia lancifer* | MF379620 | 15,926 |
|  |  |  |  | Solenoceridae | *Solenocera crassicornis* | KU899137 | 15,946 |
|  |  |  | Sergestoidea | Sergestidae | *Acetes chinensis* | JN689221 | 15,740 |
|  | Pleocyemata | Achelata |  | Palinuridae | *Palinurellus wieneckii* | KC847078 | 15,699 |
|  |  |  |  |  | *Panulirus cygnus* | KT696496 | 15,724 |
|  |  |  |  | Scyllaridae | *Ibacus alticrenatus* | MG551493 | 15,762 |
|  |  | Anomura | Chirostyloidea | Sternostylidae | *Sternostylus investigatoris* | KY352237 | 16,423 |
|  |  |  | Galatheoidea | Munidopsidae | *Shinkaia crosnieri* | EU420129 | 15,182 |
|  |  |  | Hippoidea | Albuneidae | *Stemonopa insignis* | KY352240 | 15,596 |
|  |  |  | Lithodoidea | Lithodidae | *Paralithodes platypus* | KY885248 | 16,883 |
|  |  |  | Paguroidea | Coenobitidae | *Birgus latro* | KY352241 | 16,411 |
|  |  | Astacidea | Astacoidea | Astacidae | *Astacus astacus* | KX279347\* | 15,076 |
|  |  |  | Enoplometopoidea | Enoplometopidae | *Enoplometopus debelius* | KM488333 | 15,641 |
|  |  |  | Nephropoidea | Nephropidae | *Homarus americanus* | HQ402925 | 16,432 |
|  |  |  | Parastacoidea | Parastacidae | *Engaeus lengana* | KF546209 | 15,934 |
|  |  | Axiidea |  | Axiidae | *Calocaris macandreae* | KC107812\* | 16,985 |
|  |  |  |  |  | *Eiconaxius serratus* **sp. nov.** | MN982200 | 16,195 |
|  |  |  |  | Callianassidae | *Filhollianassa ceramica* | KU362925 | 16,821 |
|  |  |  |  |  | *Neotrypaea harmandi* | LC221567 | 15,272 |
|  |  |  |  |  | *Neotrypaea japonica* | KC236422 | 15,274 |
|  |  |  |  |  | *Neotrypaea thermophila* | JN897380 | 15,240 |
|  |  |  |  |  | *Trypaea australiensis* | KM501040 | 15,485 |
|  |  |  |  | Callichiridae | *Corallianassa coutierei* | KC107817 | 15,481 |
|  |  |  |  | Eucalliacidae | *Paraglypturus tonganus* | KJ820739 | 15,924 |
|  |  |  |  | Strahlaxiidae | *Neaxius acanthus* | JN897379 | 14,909 |
|  |  |  |  |  | *Strahlaxius plectrorhynchus* | MH234571 | 15,816 |
|  |  | Brachyura | Bythograeoidea | Bythograeidae | *Austinograea alayseae* | JQ035660 | 15,620 |
|  |  |  | Calappoidea | Matutidae | *Matuta planipes* | MG756601 | 15,760 |
|  |  |  | Dromioidea | Dynomenidae | *Dynomene pilumnoides* | KT182070 | 16,475 |
|  |  |  | Eriphioidea | Menippidae | *Pseudocarcinus gigas* | AY562127 | 15,515 |
|  |  |  | Grapsoidea | Varunidae | *Eriocheir sinensis* | KM516908 | 16,378 |
|  |  |  | Homoloidea | Homolidae | *Homologenus malayensis* | KJ612407 | 15,793 |
|  |  |  | Leucosioidea | Leucosiidae | *Pyrhila pisum* | KU343210 | 15,516 |
|  |  |  | Majoidea | Majidae | *Maja squinado* | KY650652 | 16,598 |
|  |  |  | Ocypodoidea | Ocypodidae | *Ocypode cordimana* | KT896743 | 15,604 |
|  |  |  | Orithyioidea | Orithyiidae | *Orithyia sinica* | MG840649 | 15,568 |
|  |  |  | Pilumnoidea | Pilumnidae | *Pilumnus vespertilio* | MF457402 | 16,222 |
|  |  |  | Portunoidea | Portunidae | *Portunus trituberculatus* | AB093006 | 16,026 |
|  |  |  | Potamoidea | Potamidae | *Longpotamon yangtsekiense* | KY785879 | 17,885 |
|  |  |  | Raninoidea | Raninidae | *Ranina ranina* | KM189817 | 15,563 |
|  |  |  | Xanthoidea | Xanthidae | *Leptodius sanguineus* | KT896744 | 15,480 |
|  |  | Caridea | Alpheoidea | Alpheidae | *Alpheus japonicus* | MG787409 | 16,619 |
|  |  |  | Atyoidea | Atyidae | *Neocaridina denticulata* | JX156333 | 15,561 |
|  |  |  | Bresilioidea | Alvinocarididae | *Alvinocaris longirostris* | JQ035659 | 16,050 |
|  |  |  | Palaemonoidea | Palaemonidae | *Palaemon gravieri* | KT935323 | 15,740 |
|  |  |  | Pandaloidea | Pandalidae | *Heterocarpus ensifer* | MG674228 | 15,939 |
|  |  | Gebiidea |  | Axianassidae | *Axianassa australis* | MH234568 | 15,738 |
|  |  |  |  | Laomediidae | *Laomedia healyi* | MH234569 | 15,834 |
|  |  |  |  | Thalassinidae | *Thalassina kelanang* | JN897378 | 15,528 |
|  |  |  |  | Upogebiidae | *Upogebia major* | JN897377 | 16,143 |
|  |  | Glypheidea | Glypheoidea | Glypheidae | *Laurentaeglyphea neocaledonica* | KU500619 | 15,752 |
|  |  |  |  |  | *Neoglyphea inopinata* | KT984196 | 15,725 |
|  |  | Polychelida |  | Polychelidae | *Pentacheles laevis* | KX343004 | 16,015 |
|  |  |  |  |  | *Polycheles coccifer* | KX343005 | 17,080 |
|  |  |  |  |  | *Stereomastis sculpta* | KX343002 | 16,475 |
|  |  | Stenopodidea |  | Spongicolidae | *Spongiocaris panglao* | MG812382 | 15,909 |
|  |  |  |  | Stenopodidae | *Stenopus hispidus* | JN399096 | 15,528 |

\* partial mitochondrial genome