**S1 Table Primers used for fragment amplifications in fiveflatfish mitogenomes**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Forward  primer | Sequences (5′-3′) |  | Reverse  primer | Sequences (5′-3′) |
| *Psettina iijimae* | Z15 | ATTAAAGCATAACHCTGAAGATGTTAAGAT |  | F-16S | GACAAGTGATTRCGCTACCTT |
| Z-16S | CTYGTACCTTTTGCATCATG |  | F13413 | TAGCTGCTACTCGGATTTGCACCAAGAGT |
| Z-ND1 | GGBTAYATRCARHTNCGNAARGG |  | F-ND1-380 | GCRTAYTTNGARTTNGANGCYCANCC |
| Z-ATP6 | ACHTTYACNCCHACHACNCARCTNTC |  | H-ND1 | TGYATDARYTGRTCRTADCGRAANCG |
| Z13347 | AAGGATAACAGCTCATCCGTTGGTCTTAGG |  | F-COI | GGRTARTCNGARYANCGNCGDGGYAT |
| Z-Ile | AAGGRHYACTTTGATAGAG |  | F-Cys | WCAYRTNRGATTGCAAAYC |
| R-COI | GGTCAACAAATCATAAAGATATTGG |  | F-ND2 | TGDGHRATNGANGARTADGCNAG |
| Z10818 | TTYGAAGCAGCCGCMTGATACTGACAYTT |  | F11089 | TTTAACCAAGACCRGGTGATTGGAAGTC |
| Z13347 | AAGGATAACAGCTCATCCGTTGGTCTTAGG |  | F-ATP6 | AGRTGNCCNGCNGTBARRTTNGCNGT |
| Z-Cytb | TNACHTGRATYGGNGSNATRCCNGT |  | F-ND5 | ATRATNGCRTCYTTDGARWARAANCC |
| Z-Gln | CAARACTCYTNGTGCTYCC |  | F-Cytb | TGNCCRATRAKVAYRWADGGRTSTTC |
| Z-ND5 | GCNATRCTNTTYYTNTGYTCNGGNTC |  | F-Phe | GTTATGCTTTRNWTAAGCTAC |
|  |  |  |  |  |  |
| *Lophonectes gallus* | Z15 | ATTAAAGCATAACHCTGAAGATGTTAAGAT |  | F2753 | TAGATAGAAACTGACCTGGATTACTCCGGT |
| Z2733 | ATCCAGGTCAGTTTCTATC |  | F13413 | TAGCTGCTACTCGGATTTGCACCAAGAGT |
| Z-Ile | AAGGRHYACTTTGATAGAG |  | F6746 | GCGGTGGATTGTAGACCCATARACAGAGGT |
| GMP-COI-R | TCATTCTCCACGACACCT |  | F-ND2 | TGDGHRATNGANGARTADGCNAG |
| Z-ATP6 | ACHTTYACNCCHACHACNCARCTNTC |  | F-ND4 | CCYATGTGVCYNACDGADGAGTADGC |
| Z10818 | TTYGAAGCAGCCGCMTGATACTGACAYTT |  | F-ND5 | ATRATNGCRTCYTTDGARWARAANCC |
| Z-Leu | CTTAGGWACCARARACTCTTGG |  | F-COI | GGRTARTCNGARYANCGNCGDGGYAT |
| Z-ND5 | GCNATRCTNTTYYTNTGYTCNGGNTC |  | GMP-ATP-F | GCTACTTCCAGCAGTGTTA |
| Z-Cytb | TNACHTGRATYGGNGSNATRCCNGT |  | F-Gln | GGRAGCACNARGAGTYTTG |
| Z-Gln | CAARACTCYTNGTGCTYCC |  | F-Phe | GTTATGCTTTRNWTAAGCTAC |
|  |  |  |  |  |  |
| *Arnoglossus tenuis* | Z15 | ATTAAAGCATAACHCTGAAGATGTTAAGAT |  | F2671 | AGATAGAAACTGACCTGGAT |
| 16SAR | CGCCTGTTTATCAAAAACAT |  | F-ND1-380 | GCRTAYTTNGARTTNGANGCYCANCC |
| Z2733 | ATCCAGGTCAGTTTCTATC |  | H-ND1 | TGYATDARYTGRTCRTADCGRAANCG |
| Z-Ile | AAGGRHYACTTTGATAGAG |  | F11089 | TTTAACCAAGACCRGGTGATTGGAAGTC |
| Z10818 | TTYGAAGCAGCCGCMTGATACTGACAYTT |  | F13413 | TAGCTGCTACTCGGATTTGCACCAAGAGT |
| Z13347 | AAGGATAACAGCTCATCCGTTGGTCTTAGG |  | F95 | GACAGTAAAGTCAGGACCAAGCCTTTGTGC |
| Z-COI | TNACHTTYTTYCCNCARCAYTTC |  | F-COI | GGRTARTCNGARYANCGNCGDGGYAT |
|  | Z-ND5 | GCNATRCTNTTYYTNTGYTCNGGNTC |  | H-Cytb | CCNARNARDGANCCRAARTTTCA |
|  | R-Cytb | CAYGCYAAYRGHGCHTCHTTYTTYTT |  | F-Cytb | TGNCCRATRAKVAYRWADGGRTSTTC |
|  | Z-Gln | CAARACTCYTNGTGCTYCC |  | F-ND6 | ATYTAYYTDGGNGGDATRYTVGTDGT |
|  |  |  |  |  |  |
| *Chascanopsetta lugubris* | Z15 | ATTAAAGCATAACHCTGAAGATGTTAAGAT |  | F2671 | AGATAGAAACTGACCTGGAT |
| H-ND1 | GTHTCNGGNTTYAAYGTHGARTAYGC |  | F-COI | GGRTARTCNGARYANCGNCGDGGYAT |
| 16SAR | CGCCTGTTTATCAAAAACAT |  | F5196 | CTAAATGGTTGGGGTATGG |
| DK-Cytb-R | ACTTGTTACTGCCCTTGAG |  | F11089 | TTTAACCAAGACCRGGTGATTGGAAGTC |
| Z-COI | TNACHTTYTTYCCNCARCAYTTC |  | F13413 | TAGCTGCTACTCGGATTTGCACCAAGAGT |
| Z10818 | TTYGAAGCAGCCGCMTGATACTGACAYTT |  | F-Gln | GGRAGCACNARGAGTYTTG |
| Z13347 | AAGGATAACAGCTCATCCGTTGGTCTTAGG |  | H-Cytb | CCNARNARDGANCCRAARTTTCA |
| Z-Gln | CAARACTCYTNGTGCTYCC |  | F49 | GGCCCATCTTAACATCTTC |
| L17114 | RCGCCCAAAGCTAGDATTC |  | DK-16S-F | TTTCAGCKTTYCCTYGCGGTACT |
| DK-Z-CR | TCTATATCAGGTGGATAC |  | F-Phe | GTTATGCTTTRNWTAAGCTAC |
|  |  |  |  |  |  |
| *Crossorhombus valderostratus* | Z15 | ATTAAAGCATAACHCTGAAGATGTTAAGAT |  | F-ND1-380 | GCRTAYTTNGARTTNGANGCYCANCC |
| Z2733 | ATCCAGGTCAGTTTCTATC |  | F-COI | GGRTARTCNGARYANCGNCGDGGYAT |
| 16SAR | CGCCTGTTTATCAAAAACAT |  | 16SBR | CCGGTCTGAACTCAGATCACGT |
| Z-Ile | ATCAACGAACCAAGTTATCCTA |  | F11089 | TTTAACCAAGACCRGGTGATTGGAAGTC |
| Z-COI | TNACHTTYTTYCCNCARCAYTTC |  | F13413 | TAGCTGCTACTCGGATTTGCACCAAGAGT |
| Z10818 | TTYGAAGCAGCCGCMTGATACTGACAYTT |  | F-Ile | CTCTATCAAAGTRDYCCTT |
| Z13347 | AAGGATAACAGCTCATCCGTTGGTCTTAGG |  | F-ATP6 | AGRTGNCCNGCNGTBARRTTNGCNGT |
| Z-ATP6 | ACHTTYACNCCHACHACNCARCTNTC |  | F-ND5 | ATRATNGCRTCYTTDGARWARAANCC |
| Z-ND5 | GCNATRCTNTTYYTNTGYTCNGGNTC |  | F-Cytb | TGNCCRATRAKVAYRWADGGRTSTTC |
| L-ND5-450 | TTYCARCTHTTYATHGGBTGRGA |  | H-ND5 | CAYCANCCRATNARDAGRAANGA |
| Z-Gln | CAARACTCYTNGTGCTYCC |  | F-Gln | GGRAGCACNARGAGTYTTG |
| R-Cytb | CAYGCYAAYRGHGCHTCHTTYTTYTT |  | F-Phe | GTTATGCTTTRNWTAAGCTAC |