

Table S1. The most frequent tetra-, Penta- and hexanucleotide repeats in different genomic sequence of 5 Gobiidae fish (Only the most frequent 10 motifs of different type are show here. The number of motifs is in parenthesis)

	<i>A. flavimanus</i>	<i>A. stigmethonius</i>	<i>F. gymnauchen</i>	<i>C. microcephalus</i>	<i>T. barbatus</i>
Tetra	AAAT/ATTT (2351)	AAAT/ATTT (2369)	AATC/ATTG (4589)	AAAT/ATTT (8542)	AAAT/ATTT (3505)
	AATG/ATTC (1330)	AATG/ATTC (1344)	AAAT/ATTT (4144)	AAAC/GTTT (2578)	AAAC/GTTT (1582)
	ATCC/ATGG (1142)	AGAT/ATCT (1107)	AGAT/ATCT (3274)	AATC/ATTG (1928)	AATG/ATTC (1446)
	AGAT/ATCT (1060)	ATCC/ATGG (976)	ATCC/ATGG (1562)	AAAG/CTTT (1650)	AGAT/ATCT (1241)
	ACAT/ATGT (875)	ACAT/ATGT (882)	AAAC/GTTT (1313)	AGAT/ATCT (1615)	ATCC/ATGG (1198)
	ACGC/CGTG (850)	ACGC/CGTG (851)	AAGT/ACTT (1089)	ACAT/ATGT (1363)	ACGC/CGTG (1087)
	AAAC/GTTT (676)	AAAG/CTTT (704)	ACAT/ATGT (778)	ATCC/ATGG (1350)	AAAG/CTTT (992)
	AAAG/CTTT (482)	AAAC/GTTT (672)	AATG/ATTC (768)	AATG/ATTC (1222)	ACAT/ATGT (808)
	ACAG/CTGT (296)	ACAG/CTGT (385)	AAAG/CTTT (502)	ACAG/CTGT (380)	AAGG/CCTT (683)
	AAGT/ACTT (255)	AATC/ATTG (226)	ACAG/CTGT (354)	AGGG/CCCT (366)	AATC/ATTG (676)
Penta	AAAAT/ATTTT (702)	AAAAT/ATTTT (487)	AAGAT/ATCTT (254)	AAGAT/ATCTT (1198)	AAAAT/ATTTT (399)
	AATTC/AATTG (366)	AATTC/AATTG (438)	AATAG/ATTCT (239)	AAAAT/ATTTT (513)	AATTC/AATTG (211)
	AATAT/ATAIT (305)	AATAT/ATAIT (258)	ACTAT/AGTAT (126)	AATAT/ATAIT (446)	AATAT/ATAIT (194)
	ACTAT/AGTAT (145)	AAGGC/CCTTG (137)	AAACT/AGTTT (112)	AATAG/ATTCT (204)	AAACT/AGTTT (172)
	AAATT/AATTT (137)	AGATG/ATCTC (120)	AATTC/AATTG (107)	AAACT/AGTTT (180)	AAATT/AATTT (132)
	AAGAT/ATCTT (104)	AAGAT/ATCTT (107)	AATAT/ATAIT (83)	ACTAT/AGTAT (150)	AAATC/ATTTG(125)
	AAACT/AGTTT (96)	ACTAT/AGTAT (105)	AAAAT/ATTTT (82)	AAAC/GTTTT (146)	ACTAT/AGTAT (121)
	AAGGC/CCTTG (67)	AAATT/AATTT (91)	AAGGC/CCTTG (82)	AAATT/AATTT (138)	AAGAT/ATCTT (93)
	AAAGT/ACTTT (61)	AAACT/AGTTT (81)	AATAC/ATTGT (78)	AATCT/AGATT (89)	AATAC/ATTGT (88)
	ACTCT/AGAGT (58)	AATAC/ATTGT (55)	AAATC/ATTTG (73)	AGAGG/CCTCT (85)	AAAC/GTTTT (81)
Hexa	AATCAG/ATTCTG (1294)	AATCAG/ATTCTG (1044)	ACCAGG/CCTGGT (133)	AACCCT/AGGGTT (94)	ACCAGG/CCTGGT (442)
	AATGCT/AGCATT (362)	AATGCT/AGCATT (365)	ACCTGG/AGGTCC (62)	ACCAGG/CCTGGT (67)	ACCTGG/AGGTCC (207)
	ACCAGG/CCTGGT (359)	ACCAGG/CCTGGT (269)	AACCCT/AGGGTT (36)	AATCAT/ATGATT (51)	AATCAG/ATTCTG (154)
	AACCCT/AGGGTT (244)	AACCCT/AGGGTT (155)	ACTGCT/AGCAGT (27)	AAAAAT/ATTTTT (46)	AGATAT/ATATCT (113)
	ACACGC/CGTGTG (241)	ACACGC/CGTGTG (146)	AGATAT/ATATCT (22)	AAGTCT/ACTTAG (42)	AAATAT/ATAITTT (104)
	AAAAAT/ATTTTT (208)	AAAAAT/ATTTTT (143)	AAGTCT/ACTTAG (21)	AGATAT/ATATCT (32)	AAAAAT/ATTTTT (102)
	ACCTGG/AGGTCC (92)	ACCTGG/AGGTCC (87)	AATCTG/AGATTC (21)	AATACT/AGTATT (31)	AACCCT/AGGGTT (98)
	AGATAT/ATATCT (76)	ACTGCT/AGCAGT (55)	AGCTCC/AGCTGG (20)	AAGATT/AATCTT (30)	AATGCT/AGCATT (84)
	AATCAT/ATGATT (62)	AGATAT/ATATCT (54)	AACCAG/CTGGIT (18)	ACTGCT/AGCAGT (29)	ACACGC/CGTGTG (83)
	ACTGCT/AGCAGT (62)	AAATAT/ATAITTT (36)	AATGCT/AGCATT (15)	AAAATT/AATTTT (28)	ACATAT/ATATGT (71)

Table S2. Ka/Ks of 13 protein-coding genes from 5 fish.

Gene_name	Ka/Ks	<i>A. flavimanus</i>	<i>A. stigmatonhus</i>	<i>F. gymnauchen</i>	<i>C. microcephalus</i>	<i>T. barbatus</i>
COX1	<i>A. flavimanus</i>					
	<i>A. stigmatonhus</i>	0.023267394				
	<i>F. gymnauchen</i>	0.019969707	0.026790077			
	<i>C. microcephalus</i>	0.030522551	0.032104725	0.034345371		
	<i>T. barbatus</i>	0.02704615	0.030013127	0.022475565	0.0270889	
COX2	<i>A. flavimanus</i>					
	<i>A. stigmatonhus</i>	0.060606455				
	<i>F. gymnauchen</i>	0.07265503	0.063022154			
	<i>C. microcephalus</i>	0.045728394	0.056603772	0.028153836		
	<i>T. barbatus</i>	0.063853972	0.057404121	0.02105691	0.030771063	
COX3	<i>A. flavimanus</i>					
	<i>A. stigmatonhus</i>	0.033830438				
	<i>F. gymnauchen</i>	0.021139901	0.076781223			
	<i>C. microcephalus</i>	0.059251483	0.050002446	0.035756256		
	<i>T. barbatus</i>	0.052739352	0.052165389	0.037136786	0.062822879	
CYTB	<i>A. flavimanus</i>					
	<i>A. stigmatonhus</i>	0.025686321				
	<i>F. gymnauchen</i>	0.036689369	0.038418619			
	<i>C. microcephalus</i>	0.061464298	0.054628561	0.052300792		
	<i>T. barbatus</i>	0.057564782	0.042613161	0.036627495	0.048154799	
ND1	<i>A. flavimanus</i>					
	<i>A. stigmatonhus</i>	0.02776181				
	<i>F. gymnauchen</i>	0.042805135	0.056486778			
	<i>C. microcephalus</i>	0.034195739	0.046657988	0.024918047		
	<i>T. barbatus</i>	0.037594527	0.052545404	0.039143047	0.044797533	
ND2	<i>A. flavimanus</i>					
	<i>A. stigmatonhus</i>	0.086301242				
	<i>F. gymnauchen</i>	0.149257814	0.177782857			
	<i>C. microcephalus</i>	0.151264618	0.175352229	0.084774699		
	<i>T. barbatus</i>	0.197704054	0.201940766	0.102867049	0.120892388	
ND3	<i>A. flavimanus</i>					
	<i>A. stigmatonhus</i>	0.082872491				
	<i>F. gymnauchen</i>	0.035515687	0.069570894			
	<i>C. microcephalus</i>	0.080790481	0.069202102	0.058870527		
	<i>T. barbatus</i>	0.0846185	0.047938153	0.072536516	0.046622086	
ND4	<i>A. flavimanus</i>					
	<i>A. stigmatonhus</i>	0.115234827				
	<i>F. gymnauchen</i>	0.085850961	0.112414142			

	<i>C. microcephalus</i>	0.0681671	0.104809453	0.068683408	
	<i>T. barbatus</i>	0.062161757	0.096923822	0.097492652	0.085264998
	<i>A. flavimanus</i>				
	<i>A. stigmatonous</i>	0.071899326			
ND4L	<i>F. gymnauchen</i>	0.076412678	0.078452457		
	<i>C. microcephalus</i>	0.056133214	0.096154826	0.031457905	
	<i>T. barbatus</i>	0.037656989	0.088976004	0.064726868	0.035591003
	<i>A. flavimanus</i>				
	<i>A. stigmatonous</i>	0.088664862			
ND5	<i>F. gymnauchen</i>	0.06846615	0.032898989		
	<i>C. microcephalus</i>	0.100725623	0.070356146	0.035286455	
	<i>T. barbatus</i>	0.068167988	0.027858752	0.056156758	0.699094587
	<i>A. flavimanus</i>				
	<i>A. stigmatonous</i>	0.055874729			
ND6	<i>F. gymnauchen</i>	0.122100109	0.19712097		
	<i>C. microcephalus</i>	0.156756248	0.127864651	0.028988908	
	<i>T. barbatus</i>	0.15253861	0.083960605	0.150764474	0.122057646
	<i>A. flavimanus</i>				
	<i>A. stigmatonous</i>	0.058582787			
ATP6	<i>F. gymnauchen</i>	0.141045084	0.130554994		
	<i>C. microcephalus</i>	0.090274589	0.113409247	0.094115449	
	<i>T. barbatus</i>	0.103288785	0.133848575	0.079987528	0.089622561
	<i>A. flavimanus</i>				
	<i>A. stigmatonous</i>	0.08179913			
ATP8	<i>F. gymnauchen</i>	0.06769897	0.187353176		
	<i>C. microcephalus</i>	0.239273268	0.467495858	0.173938038	
	<i>T. barbatus</i>	0.02157578	0.224273504	0.174205541	0.200117202

Table S3. Data source of the 26 Gobiidae fishes studied in this study.

Family	Genus	Species	Source
Gobiidae	<i>Acanthogobius</i>	<i>Acanthogobius flavimanus</i>	in this study
		<i>Acanthogobius flavimanus</i>	NC_063711
		<i>Acanthogobius stigmethonius</i>	in this study
		<i>Acanthogobius stigmethonius</i>	MT258987
		<i>Acanthogobius ommaturus</i>	JX186192
	<i>Ctenotrypauchen</i>	<i>Ctenotrypauchen microcephalus</i>	in this study
		<i>Ctenotrypauchen microcephalus</i>	MK541897.1
		<i>Ctenotrypauchen chinensis</i>	NC_058265
	<i>Odontamblyopus</i>	<i>Odontamblyopus rebecca</i>	NC_030481
		<i>Odontamblyopus</i> sp.	KT633954
	<i>Favonigobius</i>	<i>Favonigobius gymnauchen</i>	in this study
		<i>Favonigobius gymnauchen</i>	NC_047227
		<i>Favonigobius reichei</i>	MN617828
	<i>Tridentiger</i>	<i>Tridentiger barbatus</i>	in this study
		<i>Tridentiger barbatus</i>	NC_018823
		<i>Tridentiger bifasciatus</i>	JN244650
		<i>Myersina filifer</i>	NC_063546
	<i>Mugilogobius</i>	<i>Cryptocentrus cinctus</i>	MT199211
		<i>Mugilogobius chulae</i>	NC_026519
		<i>Mugilogobius myxodermus</i>	NC_036070
		<i>Mugilogobius abei</i>	NC_023353
		<i>Rhinogobius</i>	
	<i>Rhinogobius</i>	<i>Rhinogobius leavelli</i>	NC_044964
		<i>Rhinogobius giurinus</i>	NC_022692
		<i>Rhinogobius estrellae</i>	LC648296
		<i>Rhinogobius similis</i>	LC648304
Trichonotidae	<i>Trichonotus</i>	<i>Trichonotus setiger</i>	NC_034345
Apogonidae	<i>Ostorhinchus</i>	<i>Ostorhinchus fleurieu</i>	NC_056170
	<i>Jaydia</i>	<i>Jaydia carinatus</i>	NC_060473
	<i>Sphaeramia</i>	<i>Sphaeramia orbicularis</i>	AP018927
Isuridae	<i>Carcharodon</i>	<i>Carcharodon carcharias</i>	KX389266
Ranidae	<i>Glandirana</i>	<i>Glandirana rugosa</i>	LC536284

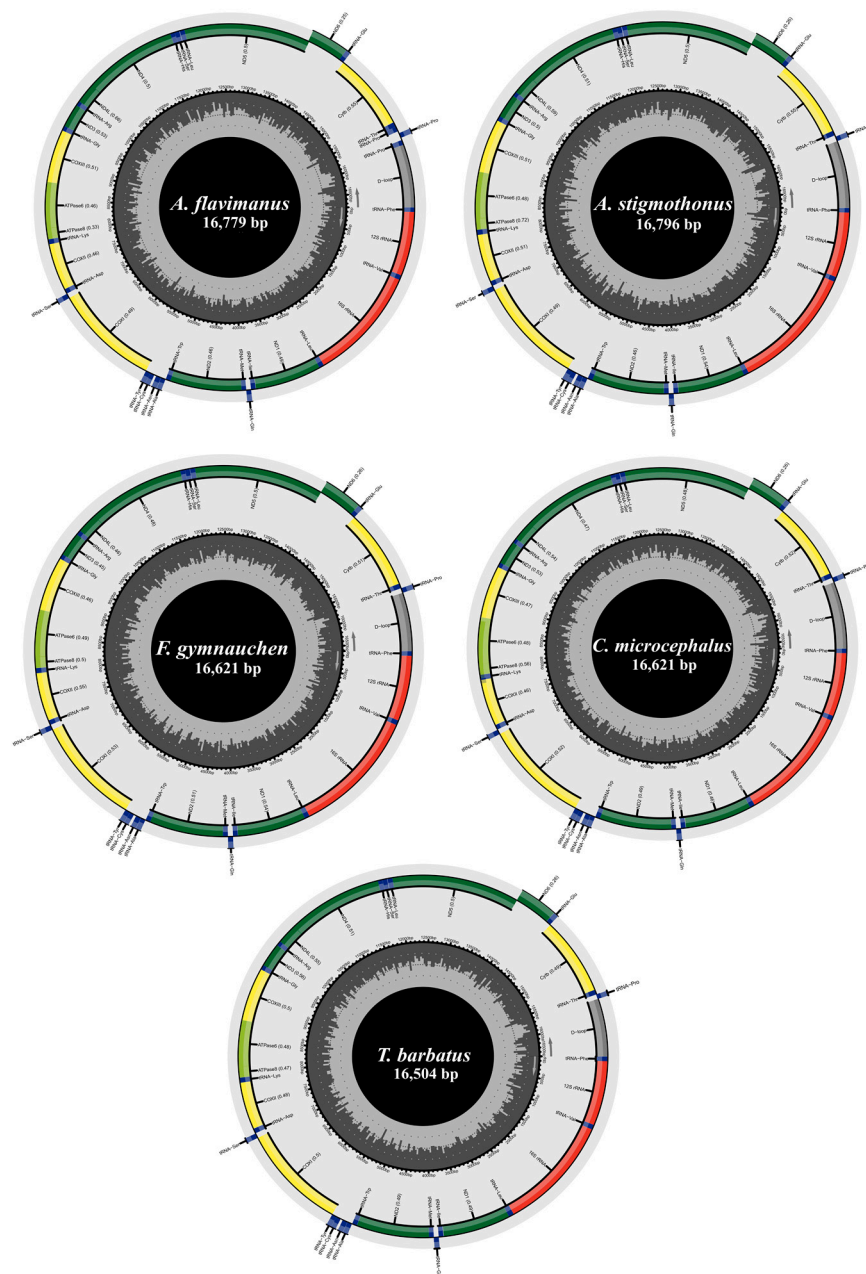


Figure S1. The structure circle diagram of 5 mitochondrial genomes.