

Supplementary Table 1. GenBank SRA and accession numbers for new and previously published data. Composite morphological species are marked with an “\*.”

Order	Family	Species	Morphology	UCE	12S	16S	COI	Myh6	ENC1	RAG1	ZIC1
Argentiniformes	Argentinidae	<i>Argentina silus</i>	Yes	Yes	AP012952	AP012952	AP012952	JX190423	KF139354	JX190822	JX191275
Osmeriformes	Osmeridae	<i>Osmerus mordax</i>	N/A	Yes	MW856836	MW856836	MW856836	JX190431	KF139359	EU621583	JX191282
Stomiiformes	Gonostomatidae	<i>Cyclothone acclinidens</i>	Yes	N/A	D84029	D84045	MF041639	Sanger	N/A	GQ860304	N/A
Stomiiformes	Gonostomatidae	<i>Cyclothone alba</i>	Yes	N/A	D84030	D84046	MG856660	N/A	N/A	N/A	N/A
Stomiiformes	Gonostomatidae	<i>Cyclothone livida</i>	Yes	N/A	D84036	D84052	KU902929	N/A	N/A	N/A	N/A
Stomiiformes	Gonostomatidae	<i>Cyclothone microdon</i>	Yes	Yes	D84037	D84053	MG856776	JX190447	GQ860410	JX190836	JX191295
Stomiiformes	Gonostomatidae	<i>Cyclothone obscura</i>	N/A	N/A	D84039	D84055	MF041582	N/A	N/A	N/A	N/A
Stomiiformes	Gonostomatidae	<i>Cyclothone pallida</i>	Yes	N/A	D84040	EU099502	KY033605	N/A	N/A	N/A	N/A
Stomiiformes	Gonostomatidae	<i>Cyclothone pseudopallida</i>	Yes	N/A	AB026029	D84058	MF041600	N/A	GQ860412	GQ860307	N/A
Stomiiformes	Gonostomatidae	<i>Cyclothone signata</i>	N/A	N/A	D84044	D84060	GU440300	N/A	N/A	N/A	N/A
Stomiiformes	Gonostomatidae	<i>Diplophos rebaini</i>	Yes	Yes	N/A	N/A	HQ563936	N/A	N/A	N/A	N/A
Stomiiformes	Gonostomatidae	<i>Diplophos taenia</i>	Yes	Yes	AP012960	AP012960	AP012960	KX227857	EU366630	KJ190079	KJ190114
Stomiiformes	Gonostomatidae	<i>Gonostoma atlanticum</i>	Yes	Yes	AB026028	AB026040	MH777665	Sanger	N/A	N/A	KJ190117
Stomiiformes	Gonostomatidae	<i>Gonostoma denudatum</i>	Yes	N/A	AB026027	AB026039	KY968167	N/A	N/A	N/A	N/A
Stomiiformes	Gonostomatidae	<i>Manducus maderensis</i>	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stomiiformes	Gonostomatidae	<i>Margrethia obtusirostra</i>	Yes	Yes	llumina	N/A	EU148237	FJ918868	GQ860416	FJ896443	FJ906664
Stomiiformes	Gonostomatidae	<i>Sigmops bathyphilus</i>	Yes	N/A	AY438705	AY443576	EU148178	N/A	GQ860413	AY438703	KJ190119
Stomiiformes	Gonostomatidae	<i>Sigmops elongatus</i>	Yes	Yes	AB026024	AB026036	MT323710	KX227886	KX227809	KJ190081	KX228034
Stomiiformes	Gonostomatidae	<i>Sigmops gracilis</i>	Yes	N/A	AB016274	AB016274	AB016274	N/A	N/A	KC442189	N/A
Stomiiformes	Gonostomatidae	<i>Sigmops longipinnis</i>	Yes	Yes	AB026025	AB026037	KJ190032	GQ860469	GQ860415	GQ860308	KJ190118
Stomiiformes	Gonostomatidae	<i>Zaphotias pedaliotus</i>	Yes	Yes	AB026021	AB026033	KF929666	FJ918867	llumina	KX230332	FJ906663
Stomiiformes	Sternoptychidae	<i>Maurolicus muelleri</i>	Yes*	Yes	AP012963	AP012963	AP012963	N/A	JX121736	N/A	N/A
Stomiiformes	Sternoptychidae	<i>Sternoptyx pseudobscura</i>	Yes	Yes	llumina	AY958662	MT323701	Sanger	GQ860426	GQ860316	KX228033
Stomiiformes	Sternoptychidae	<i>Valenciennellus tripunctulatus</i>	Yes	Yes	N/A	llumina	KF930531	GQ860472	N/A	N/A	N/A
Stomiiformes	Stomiidae	<i>Astronesthes gemmifer</i>	Yes	N/A	N/A	N/A	Sanger	Sanger	Sanger	FJ896449	FJ906670
Stomiiformes	Stomiidae	<i>Borostomias antarcticus</i>	Yes	N/A	KX929888	N/A	Sanger	Sanger	Sanger	JX255540	Sanger
Stomiiformes	Stomiidae	<i>Chauliodus macouni</i>	Yes*	Yes	N/A	AY820742	KF929725	KF139964	N/A	N/A	KF140513
Stomiiformes	Stomiidae	<i>Heterophotus ophistoma</i>	Yes	N/A	N/A	N/A	Sanger	GQ860479	Sanger	GQ860321	KC830963
Stomiiformes	Stomiidae	<i>Ichthyococcus ovatus</i>	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stomiiformes	Stomiidae	<i>Malacosteus niger</i>	Yes	N/A	KX929905	N/A	Sanger	Sanger	Sanger	Sanger	Sanger
Stomiiformes	Stomiidae	<i>Neonesthes capensis</i>	Yes	Yes	llumina	llumina	KF930177	JX190445	KF139363	GQ860322	JX191293
Stomiiformes	Stomiidae	<i>Phosichthys argenteus</i>	Yes	Yes	N/A	N/A	HQ563944	GQ860477	GQ860427	GQ860318	N/A
Stomiiformes	Stomiidae	<i>Pollichthys maui</i>	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stomiiformes	Stomiidae	<i>Polymetme thaeocoryla</i>	Yes	Yes	llumina	llumina	LC507076	KX227878	KX227804	KX228059	KJ190124
Stomiiformes	Stomiidae	<i>Triplophos hemingi</i>	Yes	Yes	llumina	llumina	GQ860354	Sanger	GQ860409	KJ190084	KJ190123
Stomiiformes	Stomiidae	<i>Vinciguerria nimbaria</i>	Yes	Yes	AP012958	AP012958	AP012958	N/A	N/A	FJ896447	FJ906668
Stomiiformes	Stomiidae	<i>Woodsia meyerwardeni</i>	Yes	Yes	llumina	llumina	HQ563948	N/A	N/A	N/A	N/A
Stomiiformes	Stomiidae	<i>Yarrella blackfordi</i>	Yes	N/A	N/A	N/A	MG856480	FJ918873	GQ860431	FJ896448	FJ906669