

Did genome duplication drive the origin of teleosts? A comparative study of diversification in ray-finned fishes

Francesco Santini, Luke J. Harmon, Giorgio Carnevale, Michael E. Alfaro

Additional file 2 – GenBank accession numbers of sequences used in this study

Table S1 - List of taxa and Rag1 GenBank accession numbers included in study.

GenBank sequence #	Taxon	Common name	Family	Order	Lineage taxon belongs to in Fig. 4
AF135482	<i>Carcharodon carcharias</i>	Great white shark	Lamnidae	Lamniformes	
AY462188	<i>Mustelus asterias</i>	Starry smooth-hound shark	Triakidae	Carchariniformes	
AY442926	<i>Lepidosiren paradoxa</i>	South American lungfish	Lepidosirenidae	Lepidosireniformes	
AY442928	<i>Protopterus dolloi</i>	African lungfish	Protopteridae		
AY442927	<i>Neoceratodus forsteri</i>	Australian lungfish	Ceratodontidae	Ceratodontiformes	
	<i>Latimeria chalumnae</i>	Coelacanth	Latimeriidae	Coelacanthiformes	
AY442925	<i>Latimeria menadoensis</i>	Coelacanth			
AF369055	<i>Polypterus sp.</i>	Bichir	Polypteridae	Polypteriformes	Polypteriformes
AF369058	<i>Lepisosteus osseus</i>	Longnose gar	Lepisosteidae	Lepisosteiformes	Holostei
AY430199	<i>Amia calva</i>	Bowfin	Amiidae	Amiiformes	Holostei
AF369056	<i>Acipenser sp.</i>	sturgeon	Acipenseridae	Acipenseriformes	Chondrostei
AY430198	<i>Scaphirhynchus albus</i>	Pallid sturgeon			
U15613	<i>Polyodon spathula</i>	Mississippi paddlefish	Polyodontidae		
AF369057					
AY430200	<i>Hiodon alosoides</i>	Goldeye	Hiodontidae	Osteoglossiformes	Osteoglossomorpha
AF369062	<i>Gnathonemus sp.</i>	Elephantfishes	Mormyridae		
AF369063	<i>Notopterus notopterus</i>	Bronze featherback	Notopteridae		
AY430201	<i>Osteoglossum bicirrhosum</i>	Arawana	Osteoglossidae		
AF369061	<i>Pantodon buchholzi</i>	Freshwater butterflyfish	Pantodontidae		
AY430202	<i>Albula vulpes</i>	Bonefish	Albulidae	Albuliformes	Elopomorpha

AY430204	<i>Megalops atlanticus</i>	Tarpon	Megalopidae	Elopiformes	
AY430203	<i>Ophichthus gomesii</i>	Shrimp eel	Ophichthidae		
DQ912115	<i>Alosa pseudoharengus</i>	Alewife	Clupeidae	Clupeiformes	Clupeomorpha
DQ912118	<i>Clupea pallasii</i>	Pacific herring			
DQ912100	<i>Denticeps clupeoides</i>	Denticle herring	Denticipitidae		Denticipitidae
DQ912108	<i>Anchoa delicatissima</i>	Slough anchovy	Engraulidae		Clupeomorpha
AY430205	<i>Engraulis japonicus</i>	Japanese anchovy			
AY430206	<i>Pellona flavipinnis</i>	Yellowfin river pellona	Pristigasteridae		
AY430212	<i>Catoprion mento</i>	Wimple piranha	Characidae	Characiformes	Characiformes
AY430211	<i>Gnathocharax steindachneri</i>				
DQ492425	<i>Distichodus notospilus</i>		Citharinidae		
DQ912097	<i>Hepsetus odoe</i>	Kafue pike	Hepsetidae		
U15614	<i>Carassius auratus</i>	Goldfish	Cyprinidae	Cypriniformes	Cypriniformes
U71093	<i>Danio rerio</i>	Zebrafish			
AY059468	<i>Hesperoleucus symmetricus</i>	California roach			
AY059469	<i>Lavinia exilicauda</i>	Hitch			
AY430210	<i>Pimephales promelas</i>	Fathead minnow			
AY430207	<i>Chanos chanos</i>	Milkfish	Chanidae	Gonorynchiformes	Gonorynchiformes
AY359225	<i>Gymnotus sp.</i>	Knifefish	Gymnotidae	Gymnotiformes	Gymnotiformes
DQ492426	<i>Sternopygus sp.</i>	Glass knifefishes	Sternopygidae		
DQ492524	<i>Bagre marinus</i>	Gafftopsail sea catfish	Ariidae	Siluriformes	Siluriformes
DQ492527	<i>Galeichthys peruvianus</i>	Peruvian sea catfish			
DQ492458	<i>Bagrus docmak</i>	Semutundu	Bagridae		
DQ492457	<i>Leiocassis poecilopterus</i>				
DQ492436	<i>Callichthys callichthys</i>	Cascarudo	Callichthyidae		
DQ492437	<i>Corydoras trilineatus</i>	Threestripe corydoras			
DQ492521	<i>Clarias batrachus</i>	Walking catfish	Clariidae		
DQ492520	<i>Heterobranchus longifi</i>	Vundu			
DQ492514	<i>Cranoglanis boudierus</i>		Cranoglanididae		
DQ492428	<i>Diplomystes mesembrinus</i>		Diplomystidae		
DQ492466	<i>Acanthodoras cataphractus</i>	Spiny catfish	Doradidae		
DQ492468	<i>Leptodoras linnelli</i>				
AY430209	<i>Ameiurus nebulosus</i>	Brown bullhead	Ictaluridae		
DQ492511	<i>Ictalurus punctatus</i>	Channel catfish			
AY552046	<i>Ancistrus sp.</i>	Armored catfishes	Loricaridae		
DQ492441	<i>Farlowella nattereri</i>	Armored catfishes			
AY552038	<i>Hypostomus latifrons</i>	Armored catfishes			

DQ492443	<i>Liposarcus multiradiatus</i>	Armored catfishes				
DQ492498	<i>Malapterurus tanganyikaensis</i>		Malapteruridae			
DQ492495	<i>Synodontis batesii</i>	Upsidedown catfish	Mochokidae			
DQ492474	<i>Hypophthalmus edentatus</i>	Highwaterman catfish	Pimelodidae			
DQ492476	<i>Phractocephalus hemioliopus</i>	Redtail catfish				
DQ492475	<i>Pimelodus ornatus</i>					
DQ492473	<i>Batrochoglanis raninus</i>		Pseudopimelodidae			
DQ492472	<i>Pseudopimelodus mangurus</i>					
DQ492507	<i>Pareutropius debauwi</i>	African glass catfish	Schilbeidae			
DQ492508	<i>Schilbe intermedius</i>	Silver catfish				
DQ492486	<i>Kryptopterus minor</i>		Siluridae			
AY552051	<i>Silurus glanis</i>	Wels catfish				
DQ492446	<i>Bagarius yarrelli</i>	Goonch	Sisoridae			
DQ492431	<i>Trichomycterus guianense</i>	Pencil or parasitic catfishes	Trichomycteridae			
AY380542	<i>Esox lucius</i>	Northern pike	Esocidae	Esociformes	Esociformes	
AY380540	<i>Dallia pectoralis</i>	Alaska blackfish	Umbridae			
AY380546	<i>Novumbra hubbsi</i>	Olympic mudminnow				
AY380549	<i>Umbra pygmae</i>	Eastern mudminnow				
AY430228	<i>Argentina sialis</i>	North-Pacific argentine	Argentinidae	Argentiniformes	Argentiniformes	
AY443564	<i>Bathylagus ochotensis</i>	Eared blacksmelt	Bathylagidae			
AY430219	<i>Brachygalaxias bullocki</i>	Galaxias	Galaxiidae	Galaxiiformes	Galaxiiformes	
AY430218	<i>Galaxias fasciatus</i>	Banded kokopu				
AY380538	<i>Hypomesus olidus</i>	Pond smelt	Osmeridae	Osmeriformes	Osmeriformes	
AY430215	<i>Spirinchus thaleichthy</i>	Longfin smelt				
AY380537	<i>Thaleichthys pacificus</i>	Eulachon				
AY380536	<i>Plecoglossus altivelis</i>	Ayu	Plecoglossidae			
AY430216	<i>Retropinna tasmanica</i>	Tasmanian smelt	Retropinnidae			
AY430217	<i>Stokellia anisodon</i>	Stokell's smelt				
AY380539	<i>Salangichthys microdon</i>	Japanese icefish	Salangidae			
U15663	<i>Oncorhynchus mykiss</i>	Rainbow trout	Salmonidae	Salmoniformes	Salmoniformes	
AY430213	<i>Prosopium williamsoni</i>	Mountain whitefish				
AY380535	<i>Salvelinus malma</i>	Dolly varden				
AY430214	<i>Thymallus thymallus</i>	Grayling				
AY438703	<i>Gonostoma bathyphilum</i>	Bristlemouths	Gonostomatidae	Stomiiformes	Stomiiformes	
AY442363	<i>Vinciguerra sp.</i>	Lightfishes	Phosichthyidae			
AY430220*	<i>Chlorophthalmus agassizi</i>	Greeneyes	Chlorophthalmidae	Aulopiformes	Aulopiformes	

AY308763	<i>Synodus intermedius</i>	Sand diver	Synodontidae		
AY430221	<i>Notoscopelus kroyeri</i>	Lancet fish	Myctophidae	Myctophiformes	Myctophiformes
AY308764	<i>Lampris guttatus</i>	Opah	Lampridae	Lampriformes	Lampriformes
AY430222	<i>Regalecus glesne</i>	King of herrings	Regalecidae		
AY308765	<i>Polymixia japonica</i>	Silver eye	Polymixiidae	Polymixiiformes	Polymixiiformes
EF033043	<i>Neobythites stigmus</i>		Ophidiidae	Ophidiiformes	Ophidiiformes
AY308782	<i>Petrotyx sanguineus</i>	Redfin brotula			
AY308766	<i>Percopsis transmontana</i>	Sand roller	Percopsidae	Percopsiformes	Percopsiformes + Gadiiformes
EF095636	<i>Beryx splendens</i>	Splendid alfonso	Berycidae	Beryciformes	Beryciformes
AY430223	<i>Sargocentron punctatissimum</i>	Speckled squirrelfish	Holocentridae		
AY308770	<i>Sargocentron vexillarium</i>	Dusky squirrelfish			
EF095635	<i>Hoplostethus mediterraneus</i>	Mediterranean slimehead	Trachichthyidae		
AF369064	<i>Gadus morhua</i>	Atlantic cod	Gadidae	Gadiformes	Percopsiformes + Gadiiformes
AY308787	<i>Merluccius albidus</i>	Offshore hake	Merlucciidae		
AY308786	<i>Lophius americanus</i>	American angler	Lophiidae	Lophiiformes	Percomorpha
EF095637	<i>Lophius budegassa</i>	Black-bellied angler			
EF095640	<i>Bedotia geayi</i>	Red-Tailed Silverside	Bedotiidae	Atheriniformes	
AY430225	<i>Menidia menidia</i>	Atlantic silverside	Atherinopsidae		
AB120889	<i>Oryzias latipes</i>	Japanese rice fish	Adrianichthyidae	Beloniformes	
EF095641					
AY308771	<i>Scomberesox saurus</i>	Atlantic saury	Scomberesocidae		
EF033040	<i>Fundulus heteroclitus</i>	Mummichog	Fundulidae	Cyprinodontiformes	
DQ235860	<i>Priapella compressa</i>	Palenque priapella	Poeciliidae		
DQ235866	<i>Xiphophorus gordonii</i>	Northern platyfish			
DQ235880	<i>Xiphophorus maculatus</i>	Southern platyfish			
AF369065	<i>Mugil cephalus</i>	Flathead mullet	Mugilidae	Mugiliformes	
EF095639					
AY308783	<i>Mugil curema</i>	White mullet			
EF033039	<i>Gasterosteus aculeatus</i>	Threespine stickleback	Gasterosteidae	Gasterosteiformes	
AY308776	<i>Zebrafish</i>	Twotone tang	Acanthuridae	Perciformes	
EF095646	<i>Parambassis ranga</i>	Indian glassy fish	Ambassidae		
AY763773	<i>Anabas testudineus</i>	Climbing perch	Anabantidae		
AY763776	<i>Ctenopoma pellegrini</i>	ctenopoma			
AY763777	<i>Microctenopoma fasciolatum</i>	Banded ctenopoma			
AY763778	<i>Sandelia capensis</i>	Cape kurper			
AY308785	<i>Antigonia capros</i>	Deepbody boarfish	Caproidae		
EF095638	<i>Capros aper</i>	Boarfish			

EF095654	<i>Parastromateus niger</i>	Black pomfret	Carangidae
AY430227	<i>Lepomis macrochirus</i>	Bluegill sunfish	Centrarchidae
EF095677	<i>Psenopsis anomala</i>	Melon seed	Centrolophidae
EF095649	<i>Centropomus medius</i>	Blackfin snook	Centropomidae
EF095655	<i>Chaetodon semilarvatus</i>	Bluecheek butterflyfish	Chaetodontidae
AY308775	<i>Chaetodon striatus</i>	Banded butterflyfish	
AY763786	<i>Channa bleheri</i>	Snake-head	Channidae
AY763788	<i>Parachanna obscura</i>	Snake-head	
DQ012245	<i>Astatotilapia burtoni</i>	Cichlid	Cichlidae
EF095671	<i>Astronotus ocellatus</i>	Oscar	
EF095672	<i>Etroplus maculatus</i>	Orange chromide	
DQ012233	<i>Haplochromis paludinos</i>	Cichlid	
DQ012226	<i>Lamprologus mocquardi</i>	Cichlid	
DQ012220	<i>Melanochromis auratus</i>	Golden mbuna	
DQ012249	<i>Metriaclima zebra</i>	Zebra mbuna	
DQ012223	<i>Oreochromis tanganyicae</i>	Cichlid	
EF095653	<i>Coryphaena sp.</i>	dolphinfish	Coryphaenidae
AY308772	<i>Drepane punctata</i>	Spotted sicklefish	Drepaneidae
AY308784	<i>Elassoma evergladei</i>	Everglades pygmy sunfish	Elassomatidae
EF095670	<i>Embiotoca jacksoni</i>	Black perch	Embiotocidae
AY208615	<i>Embiotoca lateralis</i>	Striped seaperch	
AY308773	<i>Chaetodipterus faber</i>	Atlantic spadefish	Ephippidae
EF095663	<i>Eucinostomus gula</i>	Jenny mojarra	Gerreidae
EF095666	<i>Gerres cinereus</i>	Yellow fin mojarra	
AY846564	<i>Aruma histrio</i>	Slow goby	Gobiidae
AY846500	<i>Elacatinus inornatus</i>	Inornate goby	
AY846511	<i>Ginsburgellus novemlineatus</i>	Nineline goby	
AY846562	<i>Gobiosoma bosc</i>	Naked goby	
AY846561	<i>Risor ruber</i>	Tusked goby	
EF095661	<i>Haemulon aurolineatum</i>	Tomtate grunt	Haemulidae
AY763779	<i>Helostoma temminckii</i>	Kissing gourami	Helostomatidae
AY208617	<i>Halichoeres melanurus</i>	Tail-spot wrasse	Labridae
EF095669	<i>Labrus bergylta</i>	Ballan wrasse	
AF369066	<i>Lates calcarifer</i>	Barramundi	Latidae
EF033042	<i>Lutjanus analis</i>	Mutton snapper	Lutjanidae
EF095659	<i>Mene maculata</i>	Moonfish	Menidae
EF095651	<i>Dicentrarchus labrax</i>	European seabass	Moronidae
EF095650	<i>Lateolabrax japonicus</i>	Japanese seaperch	

AY308767	<i>Morone chrysops</i>	White bass		
EF095658	<i>Mullus surmuletus</i>	Striped red mullet	Mullidae	
AY330979	<i>Nandus nandus</i>	Gangetic leafish	Nandidae	
AF519728	<i>Betta splendens</i>	Siamese fighting fish	Osphronemidae	
AF519737	<i>Macropodus opercularis</i>	Paradise fish		
AF519738	<i>Pseudosphromenus cupanus</i>	Spiketail paradisefish		
AF519734	<i>Trichogaster leerii</i>	Pearl gourami		
AY430226	<i>Etheostoma caeruleum</i>	Rainbow darter	Percidae	
AY308768	<i>Perca flavescens</i>	Yellow perch		
AY208624	<i>Abudefduf saxatilis</i>	Sergeant major	Pomacentridae	
AY208625	<i>Acanthochromis polyacanthus</i>	Spiny chromis		
AY208628	<i>Amphiprion akindynos</i>	Barrier reef anemonefish		
AY208640	<i>Chromis chromis</i>	Damselfish		
AY208649	<i>Dascyllus aruanus</i>	Whitetail dascyllus		
EF095673	<i>Pomacentrus pavo</i>			
AY208632	<i>Premnas biaculeatus</i>	Spinecheek anemonefish		
EF095675	<i>Scarus psittacus</i>	Common parrotfish	Scaridae	
EF095668	<i>Scatophagus argus</i>	Spotted scat	Scatophagidae	
EF095660	<i>Cynoscion regalis</i>	Gray weakfish	Sciaenidae	
EF095676	<i>Scomberomorus commerson</i>	Narrow-barred Spanish mackerel	Scombridae	
EF095645	<i>Holanthias chrysostictus</i>		Serranidae	
AY308777	<i>Siganus doliatus</i>	Barred spinefoot	Siganidae	
EF095657	<i>Sparus aurata</i>	Gilthead seabream	Sparidae	
EF095652	<i>Toxotes chatareus</i>	Spotted archerfish	Toxotidae	
AY430224	<i>Trinectes maculatus</i>	Hogchoker	Achiridae	Pleuronectiformes
AY308769	<i>Bothus lunatus</i>	Plate fish	Bothidae	
AY454396	<i>Hippoglossus hippoglossus</i>	Atlantic halibut	Pleuronectidae	
AF369067	<i>Pseudopleuronectes americanus</i>	Winter flounder		
EF095644	<i>Solea solea</i>	Common sole	Soleidae	
AY308774	<i>Peristedion miniatum</i>	Armored searobin	Peristediidae	Scorpaeniformes
EF095642	<i>Scorpaena onaria</i>		Scorpaenidae	
AY359221	<i>Ophisternon aenigmaticum</i>	Obscure swamp eel	Synbranchidae	Synbranchiformes
AY359218	<i>Synbranchus marmoratus</i>	Marbled swamp eel		
AY700346	<i>Anoplocapros inermis</i>	Eastern smooth boxfish	Aracanidae	Tetraodontiformes
AY700348	<i>Aracana ornata</i>	Ornate cowfish		

AY700308	<i>Balistes caprisus</i>	Grey triggerfish	Balistidae		
AY700320	<i>Balistoides viridescens</i>	Titan triggerfish			
AY700313	<i>Melichthys niger</i>	Black triggerfish			
AY700321	<i>Sufflamen chrysopterus</i>	Halfmoon triggerfish			
AY700324	<i>Allomycterus pilatus</i>	Deepwater burrfish	Diodontidae		
AY700325	<i>Diodon holocanthus</i>	Long-spine porcupinefish			
AY700326	<i>Chilomycterus schoepfi</i>	Striped burrfish			
AY308792	<i>Masturus lanceolatus</i>	Sharptail mola	Molidae		
AY700328	<i>Mola mola</i>	Ocean sunfish			
AY700331	<i>Aluterus scriptus</i>	Scrawled filefish	Monacanthidae		
AY700333	<i>Cantherhines pullus</i>	Orangespotted filefish			
AY700334	<i>Monacanthus ciliatus</i>	Fringed filefish			
AY700340	<i>Nelusetta ayraudi</i>	Chinaman-leatherjacket			
AY700344	<i>Lactophrys triqueter</i>	Smooth trunkfish	Ostraciidae		
AY308794	<i>Tetrosomus concatenatus</i>	Triangular boxfish			
AY700367	<i>Arothron hispidus</i>	White-spotted puffer	Tetraodontidae		
AY700358	<i>Canthigaster bennetti</i>	Bennett's sharpnose puffer			
AY700351	<i>Canthigaster rostrata</i>	Caribbean sharpnose-puffer			
AY700365	<i>Lagocephalus laevigatus</i>	Smooth puffer			
AY700364	<i>Monotreta leiurus</i>				
AY308795	<i>Sphoeroides dorsalis</i>	Marbled puffer			
AF108420	<i>Takifugu rubripes</i>	Torafugu			
AY700355	<i>Tetraodon fluviatilis</i>	Green pufferfish			
AY308789	<i>Trixiphichthys weberi</i>	Blacktip tripodfish	Triacanthidae		
AY308788	<i>Triacanthodes anomalus</i>	Spikefish	Triacanthodidae		
AY308779	<i>Cyttus traversi</i>	King dory	Cyttidae	Zeiformes	Zeiformes
AY308780	<i>Grammicolepis brachiusculus</i>	Thorny tinselfish	Grammicolepididae		
AY308781	<i>Alloctytus verrucosus</i>	Warty oreo	Oreosomatidae		
AY308778	<i>Zenopsis conchifer</i>	Silvery John dory	Zeidae		