

Supplemental Table S1. NCBI BioProject and BioSample accession numbers, and museum vouchers accessions for samples used in phylogenetic analyses of Pelagiaria.

Species	BioProject Number	BioSample Accession	Specimen Voucher
<i>Amarsipus carlsbergi</i>	PRJNA491630	SAMN10081044	CBM:17750
<i>Acanthocybium solandri</i>	PRJNA561597	SAMN13222424	KU:I:7184
<i>Acanthocybium solandri</i>	PRJNA561597	SAMN13222425	KU:I:5425
<i>Acanthurus bahianus</i>	PRJNA561597	SAMN13222426	YPM:ICH:024770
<i>Aphanopus carbo</i>	PRJNA561597	SAMN13222427	HUMZ:220745 Personal Collection:Peter Wainwright:2294B
<i>Fibramia lateralis</i>	PRJNA561597	SAMN13222428	YPM:ICH:025637
<i>Ariomma bondi</i>	PRJNA561597	SAMN13222429	NSMT:64808
<i>Ariomma indicum</i>	PRJNA561597	SAMN13222430	MCZ:Ich:161902
<i>Ariomma melanum</i>	PRJNA561597	SAMN13222431	YPM:ICH:027642
<i>Ariomma sp.</i>	PRJNA561597	SAMN13222432	FAKU:82391
<i>Arripis trutta</i>	PRJNA561597	SAMN13222433	SIO:94-141
<i>Assurger anzac</i>	PRJNA561597	SAMN13222434	KU:I:6839
<i>Aulostomus chinensis</i>	PRJNA561597	SAMN13222435	CBM:14077
<i>Auxis rochei</i>	PRJNA561597	SAMN13222436	CBM:12877
<i>Auxis thazard</i>	PRJNA561597	SAMN13222437	YPM:ICH:025649
<i>Benthodesmus elongatus</i>	PRJNA561597	SAMN13222438	MCZ:Ich:158586
<i>Benthodesmus simonyi</i>	PRJNA561597	SAMN13222439	HUMZ:220516
<i>Benthodesmus tenuis</i>	PRJNA561597	SAMN13222440	KU:I:5642
<i>Bothus pantherinus</i>	PRJNA561597	SAMN13222441	YPM:ICH:025808
<i>Brama caribbea</i>	PRJNA561597	SAMN13222442	CBM:15373
<i>Brama dussumieri</i>	PRJNA561597	SAMN13222443	SIO:01-183
<i>Brama japonica</i>	PRJNA561597	SAMN13222444	UW:113533
<i>Caristius macropus</i>	PRJNA561597	SAMN13222445	YPM:ICH:025577
<i>Ceratoscopelus warmingii</i>	PRJNA561597	SAMN13222446	YPM:ICH:025663
<i>Chiasmodon niger</i>	PRJNA561597	SAMN13222447	SIO:98-26 Personal Collection: Seikai National Fisheries Institute:14797
<i>Cubiceps baxteri</i>	PRJNA561597	SAMN13222448	YPM:ICH:025671
<i>Cubiceps whiteleggii</i>	PRJNA561597	SAMN13222449	YPM:ICH:025665
<i>Diplospinus multistriatus</i>	PRJNA561597	SAMN13222450	YPM:ICH:025654
<i>Dysalotus alcocki</i>	PRJNA561597	SAMN13222451	NSMT:62524
<i>Dysalotus oligoscolus</i>	PRJNA561597	SAMN13222452	no voucher
<i>Epinnula magistralis</i>	PRJNA561597	SAMN13222453	CBM:12671
<i>Eumegistus illustris</i>	PRJNA561597	SAMN13222454	
<i>Euthynnus affinis</i>	PRJNA561597	SAMN13222455	

<i>Evoxymetopon macrophthalmus</i>	PRJNA561597	SAMN13222456	Personal Collection: Seikai National Fisheries Institute:14546
<i>Evoxymetopon poeyi</i>	PRJNA561597	SAMN13222457	NSMT:77666
<i>Evoxymetopon taeniatus</i>	PRJNA561597	SAMN13222458	KU:I:5249
<i>Fistularia commersonii</i>	PRJNA561597	SAMN13222459	KU:I:7222
<i>Fistularia commersonii</i>	PRJNA561597	SAMN13222460	LSUMZ:Ichthyology:786
<i>Gadus morhua</i>	PRJNA561597	SAMN13222461	YPM:ICH:020859
<i>Gasterochisma melampus</i>	PRJNA561597	SAMN13222462	NSMT:93197
<i>Gempylus serpens</i>	PRJNA561597	SAMN13222463	NSMT:62526
<i>Gymnosarda unicolor</i>	PRJNA561597	SAMN13222464	NSMT:62530 Personal Collection: Seikai National Fisheries Institute:16241
<i>Hyperoglyphe antarctica</i>	PRJNA561597	SAMN13222465	NSMT:62530 Personal Collection: Seikai National Fisheries Institute:16241
<i>Hyperoglyphe japonica</i>	PRJNA561597	SAMN13222466	CBM:13628
<i>Icosteus aenigmaticus</i>	PRJNA561597	SAMN13222467	SIO:99-95
<i>Kali macrodon</i>	PRJNA561597	SAMN13222468	YPM:ICH:027772
<i>Kali macrura</i>	PRJNA561597	SAMN13222469	KU:I:8140
<i>Kali normani</i>	PRJNA561597	SAMN13222470	UW:115135
<i>Katsuwonus pelamis</i>	PRJNA561597	SAMN13222471	CBM:ZF:12672 Personal Collection: Tim Berra:TMB09-2
<i>Kurtus gulliveri</i>	PRJNA561597	SAMN13222472	SAMN13222472
<i>Lampris guttatus</i>	PRJNA561597	SAMN13222473	SIO:04-195
<i>Lepidocybium flavobrunneum</i>	PRJNA561597	SAMN13222474	CBM:12751
<i>Lepidopus altifrons</i>	PRJNA561597	SAMN13222475	KU:I:3546
<i>Lepidopus caudatus</i>	PRJNA561597	SAMN13222476	KU:I:8084
<i>Lepturacanthus savala</i>	PRJNA561597	SAMN13222477	LSUMZ:Ichthyology:78 Personal Collection:W. Leo Smith:370
<i>Mene maculata</i>	PRJNA561597	SAMN13222478	Personal Collection:Peter Wainwright:2260B
<i>Myripristis violacea</i>	PRJNA561597	SAMN13222479	Personal Collection:Peter Wainwright:2260B
<i>Neopinnula americana</i>	PRJNA561597	SAMN13222480	KU:I:3543
<i>Nesiarchus nasutus</i>	PRJNA561597	SAMN13222481	NSMT:75668
<i>Odontobutis obscura</i>	PRJNA561597	SAMN13222482	no voucher
<i>Pampus argenteus</i>	PRJNA561597	SAMN13222483	LSUMZ:Ichthyology:5282
<i>Pampus chinensis</i>	PRJNA561597	SAMN13222484	LSUMZ:Ichthyology:5300
<i>Pampus echinogaster</i>	PRJNA561597	SAMN13222485	KAUM:I:64926
<i>Paracaristius maderensis</i>	PRJNA561597	SAMN13222486	YPM:ICH:027617
<i>Paradiplospinus antarcticus</i>	PRJNA561597	SAMN13222487	KU:I:925
<i>Paradiplospinus gracilis</i>	PRJNA561597	SAMN13222488	YPM:ICH:022377
<i>Peprilus alepidotus</i>	PRJNA561597	SAMN13222489	KU:I:5169
<i>Peprilus burti</i>	PRJNA561597	SAMN13222490	KU:I:5086
<i>Peprilus simillimus</i>	PRJNA561597	SAMN13222491	KU:I:9394

<i>Peprilus triacanthus</i>	PRJNA561597	SAMN13222492	YPM:ICH:024677 Personal Collection:Peter Wainwright: 1568
<i>Pomatomus saltatrix</i>	PRJNA561597	SAMN13222493	CBM:13627 Personal Collection: Seikai National Fisheries Institute:14835
<i>Promethichthys prometheus</i>	PRJNA561597	SAMN13222494	YPM:ICH:025740
<i>Psenes arafurensis</i>	PRJNA561597	SAMN13222495	CBM:12866-1
<i>Psenes cyanophrys</i>	PRJNA561597	SAMN13222496	YPM:ICH:027632
<i>Psenopsis anomala</i>	PRJNA561597	SAMN13222497	KU:I:6518
<i>Pseudoscopelus altipinnis</i>	PRJNA561597	SAMN13222498	YPM:ICH:027854
<i>Pseudoscopelus astronesthicens</i>	PRJNA561597	SAMN13222499	YPM:ICH:027787
<i>Pseudoscopelus odontoglossum</i>	PRJNA561597	SAMN13222500	YPM:ICH:24624
<i>Pseudoscopelus pierbartus</i>	PRJNA561597	SAMN13222501	YPM:ICH:025805
<i>Pseudupeneus maculatus</i>	PRJNA561597	SAMN13222502	KU:I:8137
<i>Pseudoscopelus scutatus</i>	PRJNA561597	SAMN13222503	NSMT:76071
<i>Pterycombus brama</i>	PRJNA561597	SAMN13222504	OCF-P 20140707-2
<i>Rastrelliger kanagurta</i>	PRJNA561597	SAMN13222505	SIO:06-116 Personal Collection: Seikai National Fisheries Institute:16403
<i>Rexea prometheoides</i>	PRJNA561597	SAMN13222506	CBM:12641
<i>Ruvettus pretiosus</i>	PRJNA561597	SAMN13222507	YPM:ICH:020681 Personal Collection:Peter Wainwright:1207
<i>Schedophilus velaini</i>	PRJNA561597	SAMN13222508	CBM:14469
<i>Scomber japonicus</i>	PRJNA561597	SAMN13222509	KU:I:5159
<i>Scomber scombrus</i>	PRJNA561597	SAMN13222510	NMNZ:40456
<i>Scomberomorus maculatus</i>	PRJNA561597	SAMN13222511	KU:I:6785
<i>Scomberomorus niphonius</i>	PRJNA561597	SAMN13222512	SIO:00-165
<i>Scomberomorus regalis</i>	PRJNA561597	SAMN13222513	CBM:14224
<i>Scomberolabrax heterolepis</i>	PRJNA561597	SAMN13222514	KU:I:5403
<i>Sphyaena putnamae</i>	PRJNA561597	SAMN13222515	CBM:14163 Personal Collection: Seikai National Fisheries Institute:17729
<i>Taractes asper</i>	PRJNA561597	SAMN13222516	YPM:ICH:027663
<i>Taractes rubescens</i>	PRJNA561597	SAMN13222517	NSMT:65749 Personal Collection: Seikai National Fisheries Institute:15336
<i>Taractichthys longipinnis</i>	PRJNA561597	SAMN13222518	NSMT:93077
<i>Taractichthys steindachneri</i>	PRJNA561597	SAMN13222519	
<i>Tentoriceps cristatus</i>	PRJNA561597	SAMN13222520	
<i>Tetragonurus atlanticus</i>	PRJNA561597	SAMN13222521	
<i>Tetragonurus cuvieri</i>	PRJNA561597	SAMN13222522	
<i>Tetragonurus pacificus</i>	PRJNA561597	SAMN13222523	
<i>Thunnus orientalis</i>	PRJNA561597	SAMN13222524	

<i>Thunnus tonggol</i>	PRJNA561597	SAMN13222525	Personal Collection: Seikai National Fisheries Institute:16558
<i>Thyrsooides marleyi</i>	PRJNA561597	SAMN13222526	NSMT:73382
<i>Trichiurus lepturus</i>	PRJNA561597	SAMN13222527	CBM:12994 Personal Collection: Seikai National Fisheries
<i>Trichiurus sp. (okinawa ootachi)</i>	PRJNA561597	SAMN13222528	Institute:17528 Personal Collection: Seikai National Fisheries
<i>Trichiurus sp. (tengu_tachi)</i>	PRJNA561597	SAMN13222529	Institute:17533
<i>Xiphias gladius</i>	PRJNA561597	SAMN13222530	LSUMZ:Ichthyology:787
<i>Pampus punctatissimus</i>	PRJNA561597	SAMN13222531	CBM:12767-1 Personal Collection: Okinawa Churashima
<i>Pterycombus petersii</i>	PRJNA561597	SAMN13222532	Foundation:20071225
<i>Scomber australasicus</i>	PRJNA561597	SAMN13222533	CBM:12636
<i>Syngnathus fuscus</i>	PRJNA561597	SAMN13222534	YPM:ICH:023342

Institutional abbreviations: CBM, Natural History Museum and Institute, Chiba, Japan; FAKU, Kyoto University Museum, Kyoto University, Yoshida, Kochi, Japan; HUMZ, The Hokkaido University Museum, Sapporo and Fisheries Science Center, Hakodate, Hokkaido, Japan; KAUM, Kagoshima University Museum, Kagoshima, Japan; KU, University of Kansas Biodiversity Institute, Kansas, USA; LSUMZ, Louisiana Museum of Natural History, Louisiana, USA; MCZ, Museum of Comparative Zoology, Harvard University, Massachusetts, USA; NSMT, National Museum of Nature and Science, Ueno Park, Tokyo, Japan; OCF, Okinawa Churashima Foundation, Okinawa, Japan; SIO, Scripps Institution of Oceanography, Marine Vertebrate Collection, University of California, San Diego, California, USA; UW, University of Washington, Burke Museum of Natural History and Culture, Washington, USA; YPM, Yale University Peabody Museum of Natural History; Connecticut, USA.

Supplemental Table S2. Taxonomic subsample used in BUCKy analyses of topological concordance among UCE locus gene trees.

Family	Species
Amarsipidae	<i>Amarsipus carlsbergi</i>
Tetragonuridae	<i>Tetragonurus cuvieri</i>
Chiasmodontidae	<i>Kali normani</i>
Nomeidae	<i>Cubiceps baxteri</i>
Ariommatidae	<i>Ariomma melanum</i>
Stromateidae	<i>Pampus argenteus</i>
Centrolophidae	<i>Hyperoglyphe japonica</i>
Pomatomidae	<i>Pomatomus saltatrix</i>
Arripidae	<i>Arripis trutta</i>
Icosteidae	<i>Icosteus aenigmaticus</i>
Scombridae	<i>Thunnus orientalis</i>
Bramidae	<i>Brama caribbea</i>
Caristiidae	<i>Caristius macropus</i>
Scombrolabracidae	<i>Scombrolabrax heterolepis</i>
Gempylidae	<i>Gempylus serpens</i>
Trichiuridae	<i>Benthodesmus elongatus</i>

Supplemental Table S3. Samples used for IQTree maximum likelihood gene trees for use in PhyParts analysis of node support across UCE loci.

Family	Species
Myctophidae	<i>Ceratoscopelus warmingii</i>
Lampridae	<i>Lampris guttatus</i>
Menidae	<i>Mene maculata</i>
Xiphiidae	<i>Xiphias gladius</i>
Syngnathidae	<i>Syngnathus fuscus</i>
Mullidae	<i>Pseudupeneus maculatus</i>
Pomatomidae	<i>Pomatomus saltatrix</i>
Centrolophidae	<i>Hyperoglyphe antarctica</i>
Centrolophidae	<i>Schedophilus velaini</i>
Centrolophidae	<i>Psenopsis anomala</i>
Stromateidae	<i>Pampus chinensis</i>
Stromateidae	<i>Peprilus triacanthus</i>
Ariommatidae	<i>Ariomma bondi</i>
Ariommatidae	<i>Ariomma indicum</i>
Nomeidae	<i>Psenes arafurensis</i>
Nomeidae	<i>Cubiceps whiteleggii</i>
Icosteidae	<i>Icosteus aenigmaticus</i>
Bramidae	<i>Taractes asper</i>

Bramidae	<i>Pterycombus brama</i>
Caristiidae	<i>Caristius macropus</i>
Caristiidae	<i>Paracaristius maderensis</i>
Scombrrolabracidae	<i>Scomberolabrax heterolepis</i>
Gempylidae	<i>Lepidocybium flavobrunneum</i>
Gempylidae	<i>Paradiplospinus antarcticus</i>
Gempylidae	<i>Ruvettus pretiosus</i>
Trichiuridae	<i>Aphanopus carbo</i>
Trichiuridae	<i>Trichiurus lepturus</i>
Trichiuridae	<i>Benthodesmus tenuis</i>
Arripidae	<i>Arripis trutta</i>
Scombridae	<i>Gasterochisma melampus</i>
Scombridae	<i>Rastrelliger kanagurta</i>
Scombridae	<i>Acanthocybium solandri</i>
Scombridae	<i>Scomberomorus maculatus</i>
Scombridae	<i>Katsuwonus pelamis</i>
Scombridae	<i>Thunnus orientalis</i>
Amarsipidae	<i>Amarsipus carlsbergi</i>
Tetragonuridae	<i>Tetragonurus atlanticus</i>
Tetragonuridae	<i>Tetragonurus pacificus</i>
Chiasmodontidae	<i>Chiasmodon niger</i>
Chiasmodontidae	<i>Pseudoscopelus scutatus</i>
Chiasmodontidae	<i>Dysalotus alcocki</i>
Chiasmodontidae	<i>Kali macrura</i>
