

Table S1. Geographic and bathymetric distributions of the 100 species used in phylogenetic analyses, and GenBank accession numbers and Museum catalog numbers.

Species ^a	Geographic Distribution	Bathymetric Distribution (in meters) ^b Mean [range] (n)	% Records		GenBank Accession Number			Catalog number of specimen used in phylogenetic analyses	Source of distributional records and taxonomy ^c
			Shallow (<50m)	Deep (>50m)	16S	CaM	18S		
<i>Pliobothrus echinatus</i>	West and North Atlantic	443 [165-750] (6)		100	EU645266	EU645366	EU645428	H22-VIII-01-2-N-e	[1]
<i>Pliobothrus symmetricus</i>	West Atlantic	440 [139-1100] (54)		100	EU645267	EU645367	-	USNM77121	[1-3]
<i>Conopora anthohelia</i>	Southwest Pacific	737 [440-1175] (3)		100	EU645268	EU645368	EU645429	USNM1027755	[4]
<i>Conopora</i> n. sp. cf. <i>unifacialis</i>	Southwest Pacific	717 [708-727] (2)		100	EU645269	EU645369	EU645430	USNM1027752	ps
<i>Conopora</i> n. sp. A	Southwest Pacific	727 (1)		100	EU645270	-	-	USNM1071853	ps
<i>Conopora</i> n. sp. C	Southwest Pacific	240 (1)		100	EU645271	EU645370	EU645431	USNM1027759	ps
<i>Conopora laevis</i>	Indo-West Pacific	510 [130-1052] (36)		100	EU645272	-	-	USNM1071854	[4,5]
<i>Conopora verrucosa</i>	Circumpolar off Antarctica; off South America; Southwest Pacific	815 [198-2626] (78) ^d		100	EU645273	-	-	USNM60036	[4-6]
<i>Conopora</i> n. sp. cf. <i>verrucosa</i>	Southwest Pacific	775 (1)		100	EU645274	-	-	USNM1071855	ps
<i>Conopora candelabrum</i>	Southwest Pacific	607 [240-1265] (22)		100	EU645275	EU645371	EU645432	USNM1027747	[4]
<i>Conopora</i> n. sp. cf. <i>tetrastichopora</i>	Southwest Pacific	506 [290-748] (6)		100	EU645276	-	-	USNM1071856	ps
<i>Conopora</i> n. sp. B	Southwest Pacific	801 [715-925] (4)		100	EU645277	-	-	USNM1071857	ps
<i>Crypthelia trophostega</i>	North Pacific	420 [150-1913] (16)		100	EU645278	EU645372	EU645433	USNM1075952	[7]
<i>Crypthelia</i> n. sp. A	Southwest Pacific	499 (1)		100	EU645279	-	-	USNM1071896	ps
<i>Pseudocrypthelia pachypoma</i>	West and Southwest Pacific	657 [430-1089] (5)		100	EU645280	EU645373	EU272643	USNM1027728	[4,8,9]
<i>Crypthelia cryptotrema</i>	Southwest Pacific	340 [180-474] (8)		100	EU645281	EU645374	EU272641	USNM1027758	[5]
<i>Crypthelia peircei</i>	West Atlantic	406 [89-838] (16)		100	EU645282	-	-	USNM94728	[1]
<i>Crypthelia glebulenta</i>	Galápagos Islands	502 [169-806] (4)		100	EU645283	-	-	USNM84763	[10,11]
<i>Crypthelia cymas</i>	Galápagos Islands and Southwest Pacific	523 [169-1097] (14)		100	EU645284	-	-	USNM84770	[4,10,11]
<i>Crypthelia</i> n. sp. H	Southwest Pacific	358 [310-406] (2)		100	EU645285	-	-	USNM1071858	ps
<i>Crypthelia</i> n. sp. G	Southwest Pacific	325 [240-474] (5)		100	EU645286	-	-	USNM1071859	ps
<i>Crypthelia fragilis</i>	Southwest Pacific	1297 [648-2316] (9)		100	EU645287	-	-	USNM1071860	[4,6]
<i>Crypthelia</i> n. sp. I	Southwest Pacific	598 [587-609] (2)		100	EU645288	-	-	USNM1071861	ps
<i>Crypthelia</i> n. sp. F	Southwest Pacific	310 (1)		100	EU645289	-	-	USNM1071862	ps
<i>Crypthelia</i> n. sp. E	Southwest Pacific	216 [192-240] (2)		100	EU645290	-	-	USNM1071895	ps
<i>Crypthelia polypoma</i>	Southwest Pacific	541 [290-927] (11)		100	EU645291	-	-	USNM1071864	[4]
<i>Crypthelia</i> n. sp. B	Southwest Pacific	707 [440-833] (5)		100	EU645292	-	-	USNM1071866	ps
<i>Crypthelia</i> n. sp. C	Southwest Pacific	393 [290-500] (4)		100	EU645293	-	-	USNM1071869	ps
<i>Crypthelia</i> n. sp. D	Southwest Pacific	555 [422-748] (4)		100	EU645294	-	-	USNM1071871	ps
<i>Crypthelia robusta</i>	Southwest Pacific	506 [388-709] (5)		100	EU645295	-	-	USNM1071874	[4]
<i>Calyptopora sinuosa</i>	Southwest Pacific	474 [142-762] (10)		100	EU645296	EU645375	EU645434	USNM1027751	[4]

Table S1. (continued)

Species ^a	Geographic Distribution	Bathymetric Distribution (in meters) ^b Mean [range] (n)	% Records		GenBank Accession Number			Catalog number of specimen used in phylogenetic analyses	Source of distributional records and taxonomy ^c
			Shallow (<50m)	Deep (>50m)	16S	CaM	18S		
<i>Calyptopora reticulata</i>	Southwest Pacific	789 [93-2055] (40)		100	EU645297	-	-	USNM1071879	[4,6]
<i>Calyptopora</i> n. sp. cf. <i>reticulata</i>	Southwest Pacific	367 [240-440] (6)		100	EU645298	EU645376	EU645435	USNM1027723	ps
<i>Stylaster</i> n. sp. cf. <i>horologium</i>	Southwest Pacific	354 (1)		100	EU645299	EU645377	EU645436	USNM1027745	ps
<i>Stylaster</i> n. sp. cf. <i>brunneus</i>	Southwest Pacific	240 (1)		100	EU645300	EU645378	EU645437	USNM1027757	ps
<i>Stylaster horologium</i>	Southwest Pacific	707 [228-1163] (6)		100	EU645301	EU645379	EU645438	USNM1071880	[4]
<i>Stylaster</i> n. sp. A	Southwest Pacific	192 (1)		100	EU645302	EU645380	EU645439	USNM1071881	ps
<i>Stylaster duchassaingi</i>	West Atlantic	262 [40-915] (69)		97.1	EU645303	EU645381	EU645440	USNM1078387	[1]
<i>Stylaster marenzelleri</i>	Galápagos and Cocos Islands	342 [88-589] (9)		100	EU645304	EU645382	-	USNM84731	[10,11]
<i>Stylaster galapagensis</i>	Galápagos and Cocos Islands	568 [402-806] (13)		100	EU645305	EU645383	EU645441	USNM84716	[10,11]
<i>Stylaster campylecus</i>	North Pacific	194 [23-518] (37)		97.3	EU645306	EU645384	EU645442	USNM1027821	[7]
<i>Stylaster</i> cf. <i>multiplex</i>	Southwest Pacific	404 [310-499] (13)		100	EU645307	EU645385	EU645443	USNM1027725	ps
<i>Stylaster cancellatus</i>	North Pacific	346 [152-582] (9)		100	EU645308	EU645386	EU645444	USNM1027822	[7]
<i>Stylaster polyorchis</i>	North Pacific	232 [91-823] (17)		100	EU645309	EU645387	EU645445	USNM1076928	[7]
<i>Stylaster elassotomus</i>	North Pacific	369 [210-881] (7)		100	EU645310	EU645388	EU645446	USNM1027825	[7]
<i>Stylaster verrillii</i>	North Pacific	160 [87-366] (8)		100	EU645311	EU645389	EU645447	USNM1027819	[7]
<i>Stylaster laevigatus</i>	West Atlantic	368 [20-1170] (22)		95.5	EU645312	EU645390	-	USNM73189	[1]
<i>Stylaster imbricatus</i>	Southwest Pacific	493 [137-1037] (17) ^e		100	EU645313	EU645391	EU645448	USNM1027748	[4]
<i>Stylaster petrograpta</i>	Northeast Pacific	3.7 [0-15] (4)	100		EU645327	EU645398	EU645455	USNM1073478	[7,12,13]
<i>Stylaster californicus</i>	Northeast Pacific	39 [12-91] (8) ^f	75.0		EU645314	EU645392	EU645449	USNM1073262	[7]
<i>Stylaster roseus</i>	West Atlantic	84 [2-494] (74) ^f	67.6		EU645315	EU645393	EU645450	USNM1073477	[1]
<i>Stylaster papuensis</i>	West Pacific	13 [6-20] (2)	100		EU645316	-	EU645451	USNM1071946	[5]
<i>Stylaster</i> sp. D	West Pacific	9 (1)	100		EU645317	-	-	USNM1071945	ps
<i>Stylaster</i> sp. B	West Pacific	12 (1)	100		EU645318	-	EU645452	USNM1015006	ps
<i>Stylaster tenisonwoodsii</i>	West Pacific	22 [1-90] (5)	80.0		EU645319	-	-	USNM98511	[14]
<i>Stylaster</i> sp. C	West Pacific	10 (1)	100		EU645320	-	-	USNM1077817	ps
<i>Stylaster sanguineus</i>	Indo-West Pacific	8 [3-14] (5) ^f	100		EU645321	-	EU645453	USNM94601	[15]
<i>Stylaster erubescens</i>	West Atlantic	544 [83-986] (92)		100	EU645322	EU645394	-	USNM76610	[1,3]
<i>Stylaster</i> cf. <i>eguchii</i>	Southwest Pacific	498 [401-648] (7)		100	EU645323	EU645395	EU645454	USNM1027749	ps
<i>Stenohelia concinna</i>	Galápagos Islands	516 [169-806] (15)		100	EU645324	EU645396	-	USNM84747	[10,11]
<i>Stenohelia pauciseptata</i>	West Atlantic	432 [282-514] (3)		100	EU645325	EU645397	-	USNM94741	[1]
<i>Stenohelia profunda</i>	West Atlantic	506 [159-2021] (28)		100	EU645326	-	-	USNM72310	[1]
<i>Lepidopora glabra</i>	West Atlantic	606 [267-1170] (11)		100	EU645328	-	-	USNM94727	[1]
<i>Lepidopora microstylus</i>	Southwest Pacific	851 [430-1252] (9)		100	EU645329	EU645399	EU272644	USNM1027724	[4]
<i>Lepidopora</i> cf. <i>sarmentosa</i>	Southwest Pacific	838 [824-852] (2)		100	EU645330	EU645400	EU645456	USNM1027761	ps
<i>Lepidopora</i> n. sp.	Southwest Pacific	435 (1)		100	EU645331	EU645401	EU645457	USNM1027763	ps
<i>Lepidopora polystichopora</i>	Southwest Pacific	405 [197-710] (9)		100	EU645332	EU645402	EU645458	USNM1027764	[4]
<i>Lepidopora</i> n. sp. cf. <i>polystichopora</i>	Southwest Pacific	554 [192-748] (6)		100	EU645333	EU645403	EU645459	USNM1027756	ps
<i>Lepidotheca</i> n. sp. cf. <i>fascicularis</i> A	Southwest Pacific	474 (1)		100	EU645334	EU645404	EU645460	USNM1027754	ps
<i>Lepidotheca</i> n. sp. cf. <i>fascicularis</i> B	Southwest Pacific	708 (1)		100	EU645335	EU645405	EU645461	USNM1027753	ps
<i>Lepidotheca macropora</i>	Galápagos Islands	464 [169-806] (9)		100	EU645336	-	-	USNM84699	[10,11]
<i>Lepidotheca</i> n. sp.	Southwest Pacific	562 [427-787] (6)		100	EU645337	EU645406	EU645462	USNM1027727	ps

Table S1. (continued)

Species ^a	Geographic Distribution	Bathymetric Distribution (in meters) ^b Mean [range] (n)	% Records		GenBank Accession Number			Catalog number of specimen used in phylogenetic analyses	Source of distributional records and taxonomy ^c
			Shallow (<50m)	Deep (>50m)	16S	CaM	18S		
<i>Distichopora</i> n. sp. A	West Pacific	213 (1)		100	EU645338	EU645407	EU645463	USNM1006516	ps
<i>Distichopora</i> cf. <i>cervina</i>	West Atlantic	73 (1)		100	EU645340	-	-	USNM76603	ps
<i>Distichopora anceps</i>	Central Pacific (Hawaii)	424 [371-539] (8)		100	EU645341	EU645409	EU645465	USNM1021949	[16,17]
<i>Cyclohelia lamellata</i>	North Pacific	190 [83-550] (13)		100	EU645353	EU645419	EU645473	USNM1076490	[18]
<i>Distichopora borealis</i>	North Pacific	261 [79-881] (25)		100	EU645342	EU645410	EU645466	USNM1076507	[7]
<i>Distichopora asulcata</i>	Central Pacific (Hawaii)	326 [293-360] (2)		100	EU645343	EU645411	EU645467	USNM1021956	[17]
<i>Distichopora irregularis</i>	West Pacific	21 [3-46] (11)	100		EU645344	EU645412	EU645468	USNM77033	[15,19]
<i>Distichopora verwoortii</i>	West Pacific	18 (1)	100		EU645345	EU645413	-	USNM100001	[20]
<i>Distichopora</i> cf. <i>violacea</i>	West Pacific	12 (1)	100		EU645346	EU645414	-	USNM87746	[19]
<i>Distichopora</i> sp. D	West Pacific	6 (1)	100		EU645347	EU645415	-	USNM1071829	ps
<i>Distichopora</i> sp. C	West Pacific	12 (1)	100		EU645348	EU645416	EU645469	USNM1015004	ps
<i>Distichopora violacea</i>	Indo-West Pacific	6 [0-31] (23) ^f	100		EU645349	EU645417	EU645470	USNM1015005	ps
<i>Distichopora</i> sp. B	West Pacific	7 (1)	100		EU645350	-	EU645471	USNM1015007	ps
<i>Distichopora foliacea</i>	West Atlantic	270 [174-507] (23)		100	EU645351	-	EU645472	H22-VIII-01-2-N-d	[1]
<i>Distichopora laevigranulosa</i>	Galápagos Islands	538 [169-806] (5)		100	EU645352	EU645418	-	USNM84707	[10,11]
<i>Distichopora robusta</i>	East Pacific	14 [12-15] (2)	100		EU645339	EU645408	EU645464	USNM1020571	[21]
<i>Adelopora</i> n. sp. cf. <i>fragilis</i>	Southwest Pacific	666 [503-1037] (7)		100	EU645354	EU645420	EU645474	USNM1027762	ps
<i>Adelopora fragilis</i>	Southwest Pacific	660 [400-1565] (7)		100	EU645355	-	-	USNM1071882	[4]
<i>Adelopora crassilabrum</i>	Southwest Pacific	616 [282-1163] (7)		100	EU645356	EU645421	EU272642	USNM1027760	[4]
<i>Errinopsis fenestrata</i>	Subantarctic off South America	377 [165-567] (4)		100	EU645357	EU645422	-	USNM83591	[6]
<i>Errinopora nanneca</i>	North Pacific	174 [83-375] (37)		100	EU645358	EU645423	EU645475	USNM1027820	[7]
<i>Errinopora zarhyncha</i>	North Pacific	461 [207-658] (3)		100	EU645359	-	-	USNM1071915	[7]
<i>Errina macrogastra</i>	Galápagos and Cocos Islands	606 [549-704] (4)		100	EU645360	-	-	USNM84708	[10,11]
<i>Inferiolabiata lowei</i>	Southwest Atlantic and Southwest Pacific	510 [164-976] (22)		100	EU645361	EU645424	EU645476	USNM1027726	[4,6]
<i>Lepidothecha chauliostylus</i>	Southwest Pacific	782 [130-1265] (10)		100	EU645362	EU645425	EU645477	USNM1027746	[4]
<i>Stellapora echinata</i>	Southwest Atlantic	876 [215-1846] (4)		100	EU645363	-	-	USNM59945	[6]
<i>Stephanohelia</i> n. sp.	Southwest Pacific	400 [292-528] (8)		100	EU645364	EU645426	EU645478	USNM1073479	ps
<i>Systemapora ornata</i>	Southwest Pacific	428 [285-721] (19)		100	EU645365	EU645427	EU645479	USNM1027729	[4]

Abbreviations used are ‘m’ (meters) ‘CAS’ (California Academy of Sciences), ‘H’ (Harbor Branch Oceanographic Institution), ‘USNM’ (United States National Museum of Natural History collection), ‘ps’ (data obtained in the present study);

^aThe list includes 25 undescribed stylasterid species from the Norfolk Ridge in the Southwest Pacific, off New Caledonia (all species referred to by ‘n. sp.’ or ‘n. sp. cf.’ above except *Distichopora* n. sp. A, from off Palau). We use ‘n. sp.’ (*new species*) to refer to a new species that is conspicuously distinct morphologically from any described stylasterid, ‘n. sp. cf.’ (*new species, compare*) to refer a new, undescribed species, to its most morphologically similar congener, and ‘cf.’ (*compare*) to refer a possibly new species to its most morphologically similar congener. Seven tropical shallow-water species sampled in this study (*Distichopora* sp. B, C, D, *Distichopora* cf. *violacea*, and *Stylaster* sp. B, C, D) could not be unambiguously referred to described species and may represent new species. For simplicity, species referred to using ‘n. sp. cf.’ and ‘cf.’ above are referred to solely by ‘cf.’ in Figure 2 and in the main text.

^bFor collecting stations at variable depths, the average between the minimum and maximum depths surveyed in these stations was used for analyses, except for a few specimens collected by submersibles and with depths ranging from zero to over 50 meters (for example, specimen USNM94726, *Stylaster duchassaingii*, with a depth range of ‘0-349 meters’). Since these specimens were not likely collected in shallow-waters by a deep-water submersible, instead of the average depth we used the maximum depth surveyed for analyses;

^cDistributional records and taxonomy are based on taxonomic work published mostly in the past 25 years and with a comprehensive account of species synonyms and distributions (see sources);

^dThe questionable record of *Conopora verrucosa* at a depth of 5845 meters off Argentina [6] was not used to calculate the depth distribution of the species;

^eA possible record of *Stylaster imbricatus* at a depth of 4666 to 4731 meters (specimen USNM76719) was not used to calculate the depth distribution of the species;

^f *Stylaster californicus*, *Stylaster roseus*, *Stylaster sanguineus*, and *Distichopora violacea* are among the most widely observed shallow-water corals, but only a few specimens are deposited in museums. The mean depths calculated herein based on taxonomic revisions and museums records may overestimate the mean depth distribution of these species, particularly for *S. roseus*, whose depth distribution has a mean of 84 meters, but a mode of only 10 meters. The large mean depth calculated for *S. roseus* results from deep-water specimens identified as *S. roseus* in the USNM collection. Since these deep-water specimens differ morphologically from their shallow-water counterparts [1] and may represent a different species, we follow all previous studies (e.g., [1]) and consider *S. roseus* as a shallow-water dweller. One colony of *Stylaster californicus* (USNM43275) and one colony of *S. tenisonwoodsii* (USNM77165) were collected at depths of 91 m and 90 m, respectively, resulting in a relatively deep mean depth for these species. The former species is abundant in shallow-water habitats off California, U.S.A. (e.g., [22]) and may have a depth distribution shallower than the 39 m estimated herein. Shallow-water, Indo-West Pacific species of *Stylaster sanguineus* and *Distichopora violacea* are also abundant and commonly observed in shallow-water tropical reefs. The few museum records available for these species should not be regarded as an indication that they are rare. Shallow-water stylasterids have been collected for over 100 years [23] for jewelry or to be sold to shell collectors, with a harvest of ~9 tons per year solely for *S. californicus* a few decades ago [22]. This practice may have greatly reduced the abundance of stylasterids in shallow waters.

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