

Table S1 Accession numbers of sequences used in this study's phylogenetic analyses. N: Number of specimens.

Genetic Marker	Model	Suborder	Family	Species	N	Accession Number
Concatenated	GTR+G+I	Physonectae	Agalmatidae	<i>Halitemma isabu</i> sp. nov.	3	MT933178–MT933179, MT933182, MT935660–MT935661, MT935664, MT935667–MT935669
				<i>Halitemma rubrum</i>	1	AY937372, AY935281, AY937323
				<i>Agalma elegans</i>	2	AY937363, AY935271, AY937313, GQ119943, AY935298, AY937340
				<i>Agalma okeni</i>	1	GQ119944, AY935272, AY937314
				<i>Athorybia rosacea</i>	2	AY937364, AY935274, AY937316, GQ119956, AY935310, AY937352
				<i>Nanomia bijuga</i>	2	JQ716068–JQ716069, AY935282, AY937324, AY935296, AY937338
mtCOI	GTR+G+I	Cystonectae	Physaliidae	<i>Physalia physalis</i> *	1	AY937374, AY935284, AF358065
		Physonectae	Agalmatidae	<i>Halitemma isabu</i> sp. nov.	6	MT933178–MT933183
				<i>Halitemma rubrum</i>	1	AY937372
				<i>Halitemma</i> sp. 1	2	GQ119989, GQ119991
				<i>Agalma elegans</i>	5	AY937363, GQ119940–GQ119943
				<i>Agalma okeni</i>	10	GQ119944–GQ119948, MH708467–MH708471
				<i>Athorybia rosacea</i>	2	AY937364, GQ119956
				<i>Frillagalma</i> sp.	2	GQ119986–GQ119987
				<i>Marrus orthocanna</i>	1	GQ120019
				<i>Marrus</i> sp. 1	1	GQ120020
				<i>Marrus</i> sp. 2	1	GQ120021
				<i>Nanomia bijuga</i>	5	JQ716068–JQ716071, KF977305
				<i>Nanomia cara</i>	7	GQ120023–GQ120029
		Cystonectae	Physaliidae	<i>Physalia physalis</i> *	4	AY937374, GQ120032–GQ120033, MK084614
16S rRNA	T92+G	Physonectae	Agalmatidae	<i>Halitemma isabu</i> sp. nov.	6	MT935660–MT935665
				<i>Halitemma rubrum</i>	3	AY935281, AY935283, AY935316
				<i>Halitemma</i> sp.	1	KJ816934
				<i>Agalma clausi</i>	1	AY935270
				<i>Agalma elegans</i>	2	AY935271, AY935298
				<i>Agalma okeni</i>	1	AY935272
				<i>Athorybia rosacea</i>	2	AY935274, AY935310
				<i>Lychnagalma urticularia</i>	1	DQ080009
				<i>Marrus claudanielis</i>	1	DQ080007
				<i>Marrus orthocanna</i>	2	DQ080010, KJ866186
				<i>Nanomia bijuga</i>	5	AY935282, AY935296, KF977400–KF977402
		Cystonectae	Physaliidae	<i>Physalia physalis</i> *	1	AY935284

18S rRNA	K2+G+I	Physonectae	Agalmatidae	<i>Halitemma isabu</i> sp. nov.	3	MT935667–MT935669
				<i>Halitemma rubrum</i>	3	AY937323, AY937325, AY937358
				<i>Agalma clausi</i>	1	AY937312
				<i>Agalma elegans</i>	2	AY937313, AY937340
				<i>Agalma okeni</i>	1	AY937314
				<i>Athorybia rosacea</i>	2	AY937316, AY937352
				<i>Nanomia bijuga</i>	3	AF358071, AY937324, AY937338
			Apolemiidae	<i>Apolemia lanosa</i>	1	KF214714
				<i>Apolemia rubriversa</i>	1	KF214715
				<i>Apolemia</i> sp. 1	1	AY937315
				<i>Apolemia</i> sp. 2	1	AY937330
				<i>Apolemia</i> sp. 3	1	AY937331
				<i>Apolemia</i> sp. 4	1	AY937332
			Cordagalmatidae	<i>Cordagalma cordiforme</i>	1	AY937317
			Erennidae	<i>Erenna cornuta</i>	2	KX752699–KX752700
				<i>Erenna insidiator</i>	2	KX752701–KX752702
				<i>Erenna laciniata</i>	2	KX752703–KX752704
				<i>Erenna richardi</i>	1	KX752705
				<i>Erenna sirena</i>	2	KX752706–KX752707
				<i>Erenna</i> sp.	1	AY937361
			Forskaliidae	<i>Forskalia asymmetrica</i>	1	AY937319
				<i>Forskalia edwardsi</i>	3	AY937320, AY937354–AY937355
				<i>Forskalia formosa</i>	1	AY937344
				<i>Forskalia tholoides</i>	1	AY937321
			Physophoridae	<i>Physophora hydrostatica</i>	2	AF358072, AY937342
			Pyrostephidae	<i>Bargmannia amoena</i>	1	AY937333
				<i>Bargmannia elongata</i>	1	AY937334
			Resomiidae	<i>Resomia dunni</i>	1	EU880273
				<i>Resomia ornicephala</i>	1	EU880275
				<i>Resomia persica</i>	1	EU880274
			Rhodaliidae	<i>Dendrogramma enigmatica</i>	1	KU716053
				<i>Stephalia dilata</i>	1	AY937357
			Stephanomiidae	<i>Stephanomia amphitridis</i>	1	AY937322
		Calycophorae	Abylidae	<i>Abylopsis eschscholtzii</i>	1	KX384617
				<i>Abylopsis tetragona</i>	1	AY937345
			Clausophyiidae	<i>Chuniphyes moserae</i>	1	KX421847

		<i>Chuniphyes multidentata</i>	1	AY937335
		<i>Clausophyes moserae</i>	1	KX421848
		<i>Clausophyes ovata</i>	1	AY937336
		<i>Clausophyid</i> sp. 1	1	AY937347
		<i>Crystallophyes amygdalina</i>	1	KX421850
	Diphyidae	<i>Chelophyes appendiculata</i>	1	AY937346
		<i>Diphyes dispar</i>	1	AY937318
		<i>Gilia reticulata</i>	1	DQ080013
		<i>Lensia conoidea</i>	1	AY937360
		<i>Muggiaea atlantica</i>	1	AY937337
		<i>Muggiaea</i> sp.	1	AF358073
		<i>Sulculeolaria quadrivalvis</i>	2	AY937329, AY937353
	Hippopodiidae	<i>Hippopodius hippopus</i>	3	AF358069, AY937341, AY937356
		<i>Vogtia glabra</i>	1	AY937350
		<i>Vogtia pentacantha</i>	1	AY937362
	Prayidae	<i>Craseoa lathetica</i>	1	AY937339
		<i>Desmophyes haematogaster</i>	1	KX421851
		<i>Gymnopræia lapislazula</i>	1	AY937359
		<i>Lilyopsis fluoracantha</i>	1	AY919607
		<i>Lilyopsis rosea</i>	1	DQ080014
		<i>Nectadamas diomedæe</i>	1	AY937348
		<i>Nectopyramis natans</i>	1	AY937349
		<i>Nectopyramis</i> sp.	1	AF358068
		<i>Praya dubia</i>	1	AY937326
		<i>Praya</i> sp.	1	AF358067
		<i>Rosacea flaccida</i>	1	AY937328
	Sphaeronectidae	<i>Sphaeronectes christiansonae</i>	2	KX421852–KX421853
		<i>Sphaeronectes gracilis</i>	2	AF358070, AY937343
		<i>Sphaeronectes haddocki</i>	1	KX421854
Cystonectae	Physaliidae	<i>Physalia physalis</i>	1	AF358065
		<i>Physalia utriculus</i>	1	AF358066
	Rhizophysidae	<i>Rhizophysa eysenhardti</i>	1	AY937351
		<i>Rhizophysa filiformis</i>	1	AY937327
Filifera	Pandeidae	<i>Neoturris brevis</i>	1	EU448097

* Outgroup