

**Table S1.** Taxonomy, voucher catalog numbers, localities and GenBank (GB) accession numbers for gene sequences used in the study. An “N/A” = not available. Gulf of Mexico = GOM), Florida Straits = FL Straits, and Mediterranean = Mediterr.

Taxon	GenBank numbers			
	Voucher	16S	CO1	Locality
<b>ORDER DECAPODA</b> Latreille, 1816				
<i>Infraorder Caridea</i> Dana, 1852				
<u>Family Acantheephyridae</u> Spence Bate, 1888				
<b><i>Acantheephyra</i></b> A. Milne-Edwards, 1881				
<i>Acantheephyra purpurea</i> A. Milne-Edwards, 1881	HBG4167	MF197188	MF197244	GOM
<b><i>Heterogenys</i></b> Chace, 1986				
<i>Heterogenys microphthalmal</i> (Smith, 1885)	HBG937	KP075898	KP076183	Taiwan
<b><i>Ephyrina</i></b> Smith, 1885				
<i>Ephyrina benedicti</i> Smith, 1885	HBG4605	MF197196	MF197248	GOM
<i>Ephyrina ombango</i> Crosnier & Forest, 1973	HBG7902	MZ678942	N/A	GOM
<i>Ephyrina ombango</i> Crosnier & Forest, 1973	HBG7275	MH542977	MH572594	GOM
<b><i>Meningodora</i></b> Smith, 1882				
<i>Meningodora mollis</i> Smith, 1882	HBG7264	MH542973	MH572584	GOM
<i>Meningodora longisulca</i> Kikuchi, 1985	HBG4678	MF197203	N/A	GOM
<i>Meningodora longisulca</i> Kikuchi, 1985	HBG7844	MZ678940	N/A	GOM
<i>Meningodora compsa</i> (Chace, 1940)	HBG7260	MT340786	MT447403	GOM
<i>Meningodora vesca</i> (Smith, 1886)	HBG7939	MZ678949	MZ703135	GOM
<i>Meningodora vesca</i> (Smith, 1886)	HBG7999	MZ678952	N/A	GOM
<i>Meningodora vesca</i> (Smith, 1886)	HBG6950	MH542968	N/A	GOM
<b><i>Notostomus</i></b> A. Milne-Edwards, 1881				
<i>Notostomus elegans</i> A. Milne-Edwards, 1881	HBG4226	MF197200	N/A	GOM
<i>Notostomus gibbosus</i> A. Milne-Edwards, 1881	HBG4220	MF197201	MH572685	GOM
<u>Family Alvinocarididae</u> Christoffersen, 1986				
<b><i>Alvinocaris</i></b> Williams & Chace, 1982				
<i>Alvinocaris stactophila</i> Williams, 1988	AsJSL-1	N/A	AF125410	GOM
<i>Alvinocaris stactophila</i> Williams, 1988	HBG8811	MZ678954	MZ681542	GOM
<i>Alvinocaris stactophila</i> Williams, 1988	HBG8848	MZ680358	N/A	GOM

Family Disciadidae Rathbun, 1902

***Lucaya*** Chace 1939

<i>Lucaya bigelowi</i> Chace, 1939	HBG4627	MF197213	N/A	GOM
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Family Eugonatonotidae Chace, 1937

*Eugonatonotus* Schmitt, 1926

<i>Eugonatonotus crassus</i> (A. Milne-Edwards, 1881)	MNHN-IU-2012-1024	KP725521	KP759400	Atlantic
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<i>Eugonatonotus crasus</i> (A. Milne-Edwards, 1881)	HBG6822	MZ678642	N/A	GOM
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Family Nematocarcinidae Smith, 1884

***Nematocarcinus*** A. Milne-Edwards, 1881

<i>Nematocarcinus ensifer</i> (Smith, 1882)	Ne2688-2	N/A	AF125435	Pacific
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<i>Nematocarcinus cursor</i> A. Milne-Edwards, 1881	HBG554	KP075928	N/A	GOM
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<i>Nematocarcinus cursor</i> A. Milne-Edwards, 1881	HBG6202	MZ678637	N/A	FL Straits
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<i>Nematocarcinus rotundus</i> Crosnier & Forest, 1973	HBG8000	MZ678951	N/A	GOM
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<i>Nematocarcinus rotundus</i> Crosnier & Forest, 1973	HBG6134	MZ678245	N/A	GOM
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<i>Nematocarcinus rotundus</i> Crosnier & Forest, 1973	HBG3795	MZ702778	N/A	GOM
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<i>Nematocarcinus rotundus</i> Crosnier & Forest, 1973	HBG7555	MZ702557	N/A	GOM
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<i>Nematocarcinus rotundus</i> Crosnier & Forest, 1973	HBG7996	MZ678948	MZ681540	GOM
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<i>Nematocarcinus rotundus</i> Crosnier & Forest, 1973	HBG7997	N/A	MZ681540	GOM
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Family Oplophoridae Dana, 1852a

***Janicella*** Chace, 1986

<i>Janicella spinicauda</i> (A. Milne-Edwards, 1883)	HBG7002	N/A	MT444884	GOM
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***Oplophorus*** H. Milne Edwards, 1837 [in H. Milne Edwards, 1834–1840]

<i>Oplophorus gracilirostris</i> A. Milne-Edwards, 1881	HBG4222	MF197206	MF197251	GOM
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***Systellaspis*** Spence Bate, 1888

<i>Systellaspis braueri</i> (Balss, 1914)	HBG5026	MF197208	MF197255	GOM
<i>Systellaspis braueri</i> (Balss, 1914)	HBG6823	MZ678726	N/A	GOM
<i>Systellaspis debilis</i> (A. Milne-Edwards, 1881)	HBG3414	MH542906	MH572640	GOM

Family Pandalidae Haworth, 1825

***Heterocarpus*** A. Milne-Edwards, 1881

<i>Heterocarpus oryx</i> A. Milne-Edwards, 1881	HBG3746	MZ710045	N/A	GOM
<i>Heterocarpus ensifer</i> A. Milne-Edwards, 1881	HBG6844	MZ678760	MZ681493	GOM
<i>Heterocarpus ensifer</i> A. Milne-Edwards, 1881	HBG6113	MF197212	MH572672	GOM

***Plesionika*** Spence Bate, 1888

<i>Plesionika acanthonotus</i> (Smith, 1882)	C70	N/A	MG850988	Atlantic
<i>Plesionika holthuisi</i> Crosnier & Forest, 1968)	ULLZ 7953	EU868703	N/A	GOM
<i>Plesionika longipes</i> (A. Milne-Edwards, 1881)	ULLZ 8363	EU868704	N/A	GOM
<i>Plesionika longicauda</i> (Rathbun, 1901)	CCDB5778	MF490227	N/A	Atlantic
<i>Plesionika martia</i> (A. Milne-Edwards, 1883)	FCFOPC041-47	JN412688	JQ306281	Atlantic
<i>Plesionika edwardsii</i> (J.F. Brandt in von Middendorf, 1851)	JSDME70	N/A	JN412726	Atlantic
<i>Plesionika edwardsii</i> (J.F. Brandt in von Middendorf, 1851)	JSDME074-08	JN412684	N/A	Atlantic
<i>Plesionika edwardsi</i> (J.F. Brandt in von Middendorf, 1851)	HBG7564	MZ678941	N/A	GOM
<i>Plesionika ensis</i> (A. Milne-Edwards, 1881)	HBG7840	MZ707247	N/A	GOM
<i>Plesionika ensis</i> (A. Milne-Edwards, 1881)	HBG9264	MZ702635	N/A	GOM
<i>Plesionika ensis</i> (A. Milne-Edwards, 1881)	HBG6825	MZ678645	N/A	GOM
<i>Plesionika ensis</i> (A. Milne-Edwards, 1881)	HBG7995	MZ680616	MZ681521	GOM
<i>Plesionika ensis</i> (A. Milne-Edwards, 1881)	HBG4914	MF197210	N/A	GOM
<i>Plesionika richardi</i> (Coutière, 1905)	HBG3634	N/A	MT434001	GOM

Family Pasiphaeidae Dana, 1852

***Pasiphaea*** Savigny, 1816

<i>Pasiphaea merriami</i> Schmitt, 1931	HBG4171	MF197215	N/A	GOM
<b><i>Eupasiphae</i></b> Wood-Mason in Wood-Mason & Alcock, 1893				
<i>Eupasiphae serrata</i> (Rathbun, 1902)	HBG4189	MT436757	MT444887	GOM

*Suborder Dendrobranchiate Spence Bate, 1888*

Family Aristeidae Wood-Mason in Wood-Mason & Alcock, 1891

***Hemipenaeus*** Spence Bate, 1881

*Hemipenaeus carpenteri* Wood-Mason in Wood-Mason & Alcock, 1891

<i>Hemipenaeus carpenteri</i> Wood-Mason in Wood-Mason & Alcock, 1891	HBG6846	MZ678770	N/A	GOM
<i>Hemipenaeus carpenteri</i> Wood-Mason in Wood-Mason & Alcock, 1891	HBG6854	MZ678933	N/A	GOM
<i>Hemipenaeus carpenteri</i> Wood-Mason in Wood-Mason & Alcock, 1891	HBG7867	MZ702562	N/A	GOM
<i>Hemipenaeus carpenteri</i> Wood-Mason in Wood-Mason & Alcock, 1891	HBG7552	MZ702555	N/A	GOM
<i>Hemipenaeus carpenteri</i> Wood-Mason in Wood-Mason & Alcock, 1891 (Genbank)				

***Hepomadus*** Spence Bate, 1881

<i>Hepomadus glacialis</i> Spence Bate, 1881	BE1-16S	LC466634	N/A	Pacific
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***Plesiopenaeus*** Spence Bate, 1881

<i>Cerataspis monstrosus</i> Gray, 1828	HBG9204	MZ702780	N/A	GOM
<i>Cerataspis monstrosus</i> Gray, 1828	KC6217	JX403855	N/A	GOM

Family Benthescymidae Wood-Mason in Wood-Mason & Alcock, 1891

***Gennadas*** Spence Bate, 1881

<i>Gennadas valens</i> (Smith, 1884)	HBG4765	MT340799	N/A	GOM
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***Bentheogennema*** Burkenroad, 1936

<i>Bentheogennema intermedia</i> (Spence Bate, 1888)	HBG4846	MF197221	N/A	GOM
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Family Penaeidae Rafinesque, 1815

***Funchalia*** J.Y. Johnson, 1868

<i>Funchalia villosa</i> (Bouvier, 1905)	HBG6885	MZ678932	MZ681539	GOM
<i>Funchalia villosa</i> (Bouvier, 1905)	HBG7941	MZ702561	MZ702648	GOM
<i>Funchalia villosa</i> (Bouvier, 1905)	HBG6776	N/A	MZ681494	GOM
<i>Funchalia villosa</i> (Bouvier, 1905)	HBG6796	MH542999	MH572634	GOM

Family Sergestidae Dana, 1852

***Neosergestes*** Judkins & Kensley, 2008

<i>Neosergestes edwardsii</i> (Krøyer, 1855)	HBG8243	MH542882	MT447454	FL Straits
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***Parasergestes*** Judkins & Kensley, 2008

<i>Parasergestes vigilax</i> (Stimpson, 1860)	HBG8248	MT444420	MT447455	GOM
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***Allosergestes*** Judkins & Kensley, 2008

<i>Allosergestes pectinatus</i> (Sund, 1920)	HBG8311	MH542994	MT447404	FL Straits
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***Deosergestes*** Judkins & Kensley, 2008

<i>Deosergestes corniculum</i> (Krøyer, 1855)	HBG4676	MF197225	MF197258	GOM
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***Sergestes*** H. Milne-Edwards, 1830a

<i>Sergestes atlanticus</i> H. Milne-Edwards, 1830a	HBG8254	MT444422	MT447467	FL Straits
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***Gardinerosergia*** Vereshchaka, Olesen & Lunina, 2014

<i>Gardinerosergia splendens</i> (Sund, 1920)	HBG7455	MT444421	MT444899	FL Straits
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***Challengerosergia*** Vereshchaka, Olesen & Lunina, 2014

<i>Challengerosergia talismani</i> (Barnard, 1947)	HBG6810	MT436759	MT444889	GOM
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***Phorcosergia*** Vereshchaka, Olesen & Lunina, 2014

<i>Phorcosergia grandis</i> (Sund, 1920)	HBG4328	MH543003	MH572642	GOM
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***Robustosergia*** Vereshchaka, Olesen & Lunina, 2014

<i>Robustosergia regalis</i> (Gordon, 1939)	HBG7283	MT436764	MT444900	GOM
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Family Solenoceridae Wood-Mason in Wood-Mason & Alcock, 1891

***Hymenopenaeus*** Smith, 1882

<i>Hymenopenaeus debilis</i> Smith, 1882	HBG9313	N/A	MT387297	GOM
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***Mesopenaeus*** Perez Farfante, 1977

<i>Mesopenaeus tropicalis</i> (Bouvier, 1905)	HBG5014	MF197224	MF197262	GOM
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***Pleoticus*** Spence Bate, 1888

<i>Pleoticus robustus</i> (Smith, 1885)	Sp27	KJ879273	KJ879319	Mediterr.
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**Outgroup**

<i>Pseudosquilla ciliata</i> (Fabricius, 1787)	120882	HM1388844	HM138800	Atlantic
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