

## Mediterranean Marine Science

Vol 21, No 2 (2020)

Vol 21, n2



**Isopoda (crustacea) from the Levantine sea with comments on the biogeography of mediterranean isopods**

*JOSÉ CASTELLÓ, GHAZI BITAR, HELMUT ZIBROWIUS*

doi: [10.12681/mms.20329](https://doi.org/10.12681/mms.20329)

### To cite this article:

CASTELLÓ, J., BITAR, G., & ZIBROWIUS, H. (2020). Isopoda (crustacea) from the Levantine sea with comments on the biogeography of mediterranean isopods. *Mediterranean Marine Science*, 21(2), 308–339. <https://doi.org/10.12681/mms.20329>

## Isopoda (Crustacea) from the Levantine Sea with comments on the biogeography of Mediterranean isopods

### José CASTELLÓ, Ghazi BITAR and Helmut ZIBROWIUS

*Mediterranean Marine Science*, 2020, 21 (2)

**Table S1.** Material examined, per species; see Table 1 for number codes.

Species	Material examined
<i>Gnathostenetroides laodicense</i>	Samples 5.12 (12 males, 1 female (ovigerous)), 11.6 (3 males, 1 female, 3 juveniles), 12.9 (3 males, 6 females (1 ovigerous), 4 juveniles, 1 damaged specimen), 12.10 (6 males, 3 females (1 ovigerous)), 13.7 (1 male), 17.2 (1 female (ovigerous, damaged)), 30.1 (1 male juvenile)
<i>Carpis stebbingi</i>	Samples 7.2 (5 males, 2 females), 7.4 (2 females), 11.1 (1 juvenile), 12.6 (1 female), 13.6 (2 females), 14.2 (1 female), 17.2 (5 males, 2 females), 23.1 (1 male, 3 females), 23.2 (1 male, 1 damaged specimen)
<i>Joeropsis legrandi</i>	Samples 5.5 (1 male), 12.5 (1 female), 25.4 (2 males, 2 females (1 ovigerous), 1 damaged specimen)
<i>Apanthura addui</i>	Samples 3.1 (1 female, 1 adult juvenile, 1 postmanca), 13.3 (1 female), 14.1 (1 female), 17.1 (1 manca), 17.2 (1 female, 2 mancas), 19.2 (4 females (1 damaged), 4 postmancas, 25 mancas), 20.2 (1 male), 20.3 (1 female), 20.4 (1 female (damaged)), 22.3 (1 manca), 25.2 (1 male), 25.4 (1 female (damaged))
<i>Mesanthura pacoi</i>	Samples 3.1 (1 female), 5.1 (1 manca), 7.2 (2 males, 11 females (1 ovigerous), 1 postmanca, 5 mancas), 7.4 (1 male, 1 female (ovigerous), 4 mancas), 10.2 (1 female), 11.4 (1 manca), 11.5 (1 manca), 12.8 (1 manca), 20.2 (1 female), 21.2 (3 females (1 ovigerous), 1 manca), 22.1 (1 male (damaged), 1 female), 25.3 (2 females (1 ovigerous)), 26.1 (4 males, 9 females (3 damaged)), 26.3 (2 females), 27.1 (1 female (damaged))
<i>Eisothistos macrurus</i>	Samples 11.2 (1 postmanca), 12.3 (1 female), 12.8 (1 female)
<i>Heptanthura cryptobia</i>	Sample 11.3 (1 juvenile (damaged))
<i>Kupellonura serratelson</i>	Sample 7.4 (1 postmanca, 2 mancas)
<i>Atarbolana beirutensis</i>	Samples 25.1 (2 females (1 ovigerous, 1 damaged)), 25.2 (1 juvenile)
<i>Cirolana bitari</i>	Samples 7.2 (2 females), 19.2 (1 male, 1 female), 22.1 (1 juvenile), 22.2 (1 female), 26.1 (2 males, 3 females, 1 juvenile)
<i>Cirolana cranchi</i>	Sample 1.1 (1 male)
<i>Cirolana manorae</i>	Samples 26.1 (3 males (1 damaged), 7 females (6 ovigerous), 4 juveniles), 26.2 (2 males, 1 juvenile), 26.3 (1 juvenile)
<i>Cirolana zibrowiusi</i>	Samples 21.3 (1 female), 26.1 (1 male, 2 females (2 ovigerous), 1 juvenile), 26.3 (1 female (ovigerous))
<i>Metacirolana rotunda</i>	Samples 3.1 (2 females with oostegites, 6 immature individuals, 2 juveniles manca), 5.1 (1 female with oostegites, 4 immature individuals, 3 juveniles manca), 5.4 (1 female with oostegites, 1 juvenile manca), 5.7 (1 female with oostegites, 1 immature individual), 5.8 (1 female with oostegites), 5.11 (1 immature individual, 1 juvenile manca), 9.1 (1 female with oostegites, 11 immature individuals, 2 juveniles manca), 9.2 (2 females with oostegites), 9.3 (1 immature individual), 9.4 (2 females with oostegites, 4 juveniles manca), 10.1 (1 female with oostegites, 2 immature individuals), 12.1 (2 females with oostegites, 1 juvenile manca), 12.2 (1 immature individual), 12.4 (1 immature individual), 12.7 (1 female with oostegites), 13.3 (3 females with oostegites), 13.5 (1 female with oostegites, 6 immature individuals, 4 juveniles manca, 1 damaged individual), 13.6 (1 female with oostegites, 1 immature individual), 15.1 (1 immature individual), 16.1 (1 ovigerous female, 1 immature individual), 17.1 (1 female with oostegites), 17.2 (2 immature individuals), 18.1 (2 juveniles manca), 19.1 (3 females with oostegites, 2 immature individuals, 3 juveniles manca), 20.3 (1 immature individual), 22.2 (1 ovigerous female, 5 immature individuals, 6 juveniles manca), 22.3 (2 females with oostegites, 3 immature individuals), 22.4 (1 female with oostegites, 3 immature individuals, 3 juveniles)

continued

Table S1 continued

Species	Material examined
<i>Elaphognathia bacescoi</i>	Samples 5.6 (1 male), 10.1 (1 male), 12.7 (1 male), 13.2 (1 male), 13.6 (1 male, 1 female), 14.1 (1 male), 27.2 (2 males (1 damaged), 3 pranizas), 30.1 (1 male, 2 pranizas)
<i>Gnathia dentata</i>	Samples 3.1 (3 males (1 damaged)), 12.8 (6 males, 2 pranizas)
<i>Gnathia illepidus</i>	Sample 26.2 (4 males)
<i>Gnathia inopinata</i>	Sample 13.3 (1 male, 1 praniza)
<i>Gnathia vorax</i>	Sample 12.8 (1 male)
<i>Cymodoce fuscina</i>	Samples 4.1 (2 males, 3 males juveniles), 26.1 (1 male)
<i>Cymodoce pilosa</i>	Samples 2.1 (1 male juvenile), 3.1 (1 male, 1 male juvenile, 1 juvenile), 5.3 (2 males juveniles), 10.2 (1 male juvenile), 13.1 (1 male juvenile), 13.3 (1 male), 29.1 (1 male juvenile), 29.2 (1 male juvenile), 32.1 (2 males juveniles)
<i>Dynamene bicolor</i>	Samples 5.9 (4 males), 6.1 (1 male), 8.1 (1 male), 13.3 (2 males), 18.2 (2 males), 24.1 (1 male), 25.3 (2 males, 1 female), 28.1 (1 male), 29.3 (1 female), 32.1 (1 female)
<i>Dynamene magnitorata</i>	Samples 7.1 (3 juveniles), 20.5 (1 female)
<i>Ischyromene bicarinata</i>	Sample 5.2 (2 males, 2 females (2 ovigerous))
<i>Paracerceis sculpta</i>	Sample 26.1 (2 males, 1 female)
<i>Paradella diana</i>	Samples 7.3 (6 females), 21.4 (3 females (1 ovigerous), 1 juvenile), 26.2 (3 males, 8 females, 15 juveniles)
<i>Pseudocerces cf. seleneides</i>	Sample 20.1 (1 female (ovigerous))
<i>Sphaeroma walkeri</i>	Samples 5.10 (3 females), 21.1 (2 females), 21.2 (2 males, 3 females (2 ovigerous), 9 juveniles), 21.3 (1 juvenile), 21.4 (4 females, 6 juveniles), 26.1 (1 female)

**Table S2.** List of isopod species (excluding Epicaridea, Oniscidea, and brackish water Aselloidea) reported from the Suez Canal, Red Sea, and Gulf of Aden. Additional information: shared species with other Indian Ocean regions, and with the Mediterranean Sea, with subregions indicated in square brackets (see Figure 2 for number codes). \*type locality of the species identified in this study; \*\*doubtful record; \*\*\*uncertain validity; \*\*\*\*uncertain taxonomic significance; \*\*\*\*\*not in WoRMS (last accessed: 20 November 2019); abbreviations: A, absent; P, previously cited; S, found in the present study.

Species	Indian Ocean [other regions]	Gulf of Aden	Red Sea	Suez Ca- nal	Mediterra- nean Sea [subre- gions]
ASELLOTA					
JANIROIDEA					
<b>Janiridae</b>					
<i>Carpias cf. algicola</i> (Miller, 1941)	P [Comoros Islands, Aldabra Atoll, Mauritius, India]		P		A
<i>Carpias crosslandi</i> (Stebbing, 1910)	P [Egmont Islands, Cha- gos Archipelago]		P		P [7]
<i>Carpias stylodactylus</i> (Nobili, 1906)	A		P	P	A
<b>Joeropsididae</b>					
<i>Joeropsis meteor</i> Müller, 1991	A	P			A
<i>Joeropsis rathbunae</i> Richardson, 1902	A			P	P [7]
<i>Joeropsis wolffi</i> Müller, 1991	A	P			A
<b>Microparasellidae</b>					
<i>Angeliera phreaticola</i> Chappuis & Delamare- Deboutteville, 1952	P [Madagascar, India]				P [2]
<i>Angeliera xarifae</i> Siewing, 1959	A	P			A
<b>Munnidae</b>					
<i>Munna spinifera</i> Robinson & Menzies, 1961	A	P			A
<b>Munnopsidae</b>					
<i>Acanthocope pentacornis</i> Müller, 1989	A	P			A
<b>Paramunnidae</b>					
<i>Munnogonium adenensis</i> Müller, 1991	A	P			A
<b>Pleurocopidae</b>					
<i>Pleurocope dasyura</i> Walker, 1901	P [Sri Lanka]				P [2]
STENETRIOIDEA					
<b>Stenetriidae</b>					
<i>Hansenium chiltoni</i> (Stebbing, 1905)***	P [Sri Lanka, Seychelles]		P		A
<i>Machatrium monodi</i> (Nordenstam, 1946)	P [Seychelles]		P		A
<i>Tristenium acutirostrum</i> (Müller, 1991)	A	P			A
CYMOTHOIDA					
CYMOTHOOIDEA					
<b>Aegidae</b>					
<i>Aegiochus dollfusi</i> (Monod, 1933)	P [Somalia, Madagascar]		P		A
<i>Rocinela orientalis</i> Schiödte & Meinert, 1879	P [South Africa, Zanzibar, India, Sri Lanka]	P	P	P	A
<b>Cymothoidae</b>					
<i>Anilocra leptosoma</i> Bleeker, 1857	P [Java]		P		P [7]
<i>Anilocra meridionalis</i> Searle, 1914	A			P	A
<i>Ceratothoa guttata</i> (Richardson, 1910)	P [Madagascar]		P		A
<i>Ceratothoa imbricata</i> (Fabricius, 1775)	P [South Africa, Mozambique, Java]		P		P [5]
<i>Ceratothoa marisrubri</i> Trilles, Colorni & Golani, 1999	A		P		A

continued

Table S2 continued

Species	Indian Ocean [other regions]	Gulf of Aden	Red Sea	Suez Ca- nal	Mediterra- nean Sea [subre- gions]
<i>Ceratothoa oxyrrynchaena</i> Koelbel, 1878	A		P		P [2, 3, 4, 5, 7, 8]
<i>Ceratothoa venusta</i> (Avdeev, 1978)*****	A		P		A
<i>Cterissa apogonae</i> Trilles & Paperna, 1980*****	A		P		A
<i>Cymothoa eremita</i> (Brunnich, 1783)	P [Zanzibar, India, Sri Lanka]	P	P		A
<i>Cymothoa exigua</i> Schiödte & Meinert, 1884	A		P	P	A
<i>Cymothoa selari</i> Avdeev, 1978	A		P		A
<i>Elthusa nanoides</i> (Stebbing, 1905)	P [Sri Lanka]		P		P [7]
<i>Livoneca papernea</i> Trilles, Colorni & Golani, 1999****	A		P		A
<i>Mothocya melanosticta</i> (Schiödte & Meinert, 1884)	P [South Africa, Mozambique]		P		A
<i>Nerocila bivittata</i> (Risso, 1816)	A			P	P [1, 2, 3, 4, 5, 6, 7, 8]
<i>Nerocila sigani</i> Bowman & Tareen, 1983	P [Persian Gulf, India]		P		A
<i>Pleopodias vigilans</i> Richardson, 1911	A		P		A
<i>Renocila thresherorum</i> Williams & Bunkley-Williams, 1980	A			P	A
<b>Gnathiidae</b>					
<i>Gnathia piscivora</i> Paperna & Por, 1977	A		P		A
<i>Gnathia rhinobatis</i> (Kossman, 1877)*****	A		P	P	A
<b>ANTHUROIDEA</b>					
<b>Anthuridae</b>					
<i>Amakusanthura motasi</i> (Negoescu, 1980)	A	P	P		A
<i>Amakusanthura pori</i> (Wägele, 1981)	A		P		A
<i>Apanthura addui</i> Wägele, 1981	P [Maldives*]				S [7]
<i>Apanthura sandalensis</i> Stebbing, 1900	P [Mozambique, Somalia, Madagascar, Mauritius, India]	P	P		P [7, 8]
<i>Apanthura stanjeki</i> Wägele, 1981	A		P		A
<i>Caenanthura indica</i> Negoescu, 1980	P [Gulf of Oman]	P			A
<i>Cyathura francispori</i> Negoescu, 1981	A			P	A
<i>Haliophasma adinae</i> (Negoescu, 1980)	P [Gulf of Oman]	P			A
<i>Haliophasma palmatum</i> Wägele, 1981	A		P		A
<b>Hyssuridae</b>					
<i>Xenanthura sinaica</i> Wägele, 1981	A		P		A
<b>Leptanthuridae</b>					
<i>Leptanthura thalassae</i> Negoescu, 1980	A	P	P		A
<b>CIROLANOIDEA</b>					
<b>Cirolanidae</b>					
<i>Baharilana bisulcata</i> (Hobbins & Jones, 1993)	A		P		A
<i>Cirolana anadema</i> Glynn, 1972*****	A		P	P	A
<i>Cirolana bovina</i> Barnard, 1940	P [India, Kenya, South Africa]		P	P	P [7]
<i>Cirolana corrugis</i> Jones, 1976	P [Kenya]		P		A

continued

Table S2 continued

Species	Indian Ocean [other regions]	Gulf of Aden	Red Sea	Suez Ca- nal	Mediterra- nean Sea [subre- gions]
<i>Cirolana cranchii</i> Leach, 1818	P [South Africa]				P [1, 2, 5, 7, 8]
<i>Cirolana manorae</i> Bruce & Javed, 1987	P [Pakistan*]			P	S [7]
<i>Cirolana meseda</i> Hobbins & Jones, 1993	A		P		A
<i>Cirolana parva</i> Hansen, 1890	A		P**	P**	P [8**]
<i>Cirolana theleceps</i> Barnard, 1940	P [South Africa]		P	P	A
<i>Eurydice arabica</i> Jones, 1974	A		P		A
<i>Eurydice inermis</i> Hansen, 1890	A		P		P [1, 2, 4, 5]
<i>Eurydice marisrubri</i> Jones & Nithyanandan, 2012	A		P		A
<i>Eurydice pulchra</i> Leach, 1815	P [India]		P	P	P [5, 6, 7, 8]
<i>Eurydice tridentata</i> Jones & Nithyanandan, 2012	A		P		A
<i>Exciroilana orientalis</i> (Dana, 1853)	P [Kenya, Madagascar, Persian Gulf, Nicobar Islands, Malaysia]		P		A
<i>Metacirolana fishelsoni</i> (Bruce & Jones, 1978)	A		P		A
<i>Metacirolana rotunda</i> (Bruce & Jones, 1978)	P [Tanzania]		P		S [7]
<i>Natatolana insignis</i> Hobbins & Jones, 1993	A		P		A
<b>Corallanidae</b>					
<i>Argathona hirsuta</i> Hobbins & Jones, 1993	A		P		A
<i>Argathona macronema</i> (Bleeker, 1857)	P [Kenya, Madagascar, Chagos Archipelago, Java, Indonesia]		P		A
<i>Corilana erythraea</i> Kossman, 1880	A		P		A
<i>Lanocira latifrons</i> Stebbing, 1910	P [Mozambique]		P		A
<i>Lanocira zeylanica</i> Stebbing, 1905	P [Kenya, India, Sri Lanka]		P		A
LIMNORIIDEA					
LIMNORIOIDEA					
<b>Limnoriidae</b>					
<i>Limnoria lignorum</i> (Rathke, 1799)	A			P	P** [1, 2, 3, 4, 5, 7, 8]
MICROCERBERIDEA					
<b>Microcerberidae</b>					
<i>Coxicerberus tabai</i> (Wägele, 1982)	A		P		A
SPHAEROMATIDEA					
SPHAEROMATOIDEA					
<b>Sphaeromatidae</b>					
<i>Cilicæa latreillei</i> Leach, 1818	P [South Africa, Mozambique, Kenya, Sri Lanka, Indonesia]		P		A
<i>Cymodoce erythraea</i> Nobili, 1906	A		P		P [2, 5, 6]
<i>Cymodoce fuscina</i> Schotte & Kensley, 2005	P [Persian Gulf*]				S [5 ( <i>aff.</i> ), 7]
<i>Cymodoce pilosa</i> Milne Edwards, 1840	A		P		P [1, 2, 3, 5, 7, 8]
<i>Cymodoce richardsoniae</i> Nobili, 1906	A		P		A
<i>Cymodoce spinosa</i> (Risso, 1816)	A		P	P	P [1, 2, 3, 4, 5, 7]

continued

Table S2 continued

Species	Indian Ocean [other regions]	Gulf of Aden	Red Sea	Suez Ca- nal	Mediterra- nean Sea [subre- gions]
<i>Cymodoce truncata</i> Leach, 1814	A		P	P	P [1, 2, 3, 4, 5, 7, 8]
<i>Dynamene bidentata</i> (Adams, 1800)	A		P	P	P** [1, 2, 5, 6, 7, 8]
<i>Dynamene edwardsi</i> (Lucas, 1849)	A		P	P	P [1, 2, 3, 5, 7, 8]
<i>Dynamenella savignii</i> (Milne-Edwards, 1840)	P [South Africa]		P		P [7]
<i>Paracerceis sculpta</i> (Holmes, 1904)	P [South Africa]			P	P [1, 2, 3, 4, 5, 7, 8]
<i>Paracilicæa eupyga</i> (Nobili, 1906)	A		P		A
<i>Paracilicæa mossambica</i> Barnard, 1914	P [Mozambique, Madagascar, Aldabra Atoll, Seychelles, Mauritius]		P		A
<i>Paradella heptaphymata</i> Shoukr, Mona & Rizk, 1987	A		P	P	A
<i>Pseudocerceis seleneides</i> Messana, 1988	P [Somalia*]				S (cf) [7]
<i>Sphaeroma granti</i> Walker & Scott, 1903	A	P	P		A
<i>Sphaeroma serratum</i> (Fabricius, 1787)	P [South Africa, Mozambique, Madagascar, Thailand]		P	P	P [1, 2, 3, 4, 5, 6, 7, 8]
<i>Sphaeroma walkeri</i> Stebbing, 1905	P [South Africa, Mozambique, India, Sri Lanka]		P	P	P [1, 2, 5, 6, 7, 8]
<i>Sphaeromopsis reticulata</i> (Stebbing, 1910)	A		P		A
VALVIFERA					
<b>Arcturidae</b>					
<i>Arcturinoidea gibbosus</i> Müller, 1989	P [Zanzibar]	P			A
<b>Idoteidae</b>					
<i>Idotea balthica</i> (Pallas, 1772)	A		P		P [1, 2, 3, 5, 6, 7, 8]
<i>Idotea metallica</i> Bosc, 1802	P [South Africa, Mozambique, Seychelles, Mauritius, Saint Paul and Amsterdam Islands]		P		P [1, 2, 3, 4, 5, 6, 7, 8]
<i>Synidotea variegata</i> Collinge, 1917	P [South Africa, Mozambique, Madagascar, Sri Lanka, India, Indochina]		P	P	P [7]

**Table S3.** Sources used in Table 2 and Table S2, by regions and subregions.

Region	Subregion	Mediterranean Sea	Red Sea and Gulf of Aden
	<b>1. Western Mediterranean: Iberian Peninsula (Strait of Gibraltar, Alboran Sea, and Mediterranean Sea), eastern archipelagos of Iberian Peninsula, and Roussillon (France)</b>	Artüz & Kubanç, 2012, 2017a; Castelló <i>et al.</i> , 2016; Chappuis & Delamare-Deboutteville, 1952; George & Menzies, 1968; Holdich, 1970; Junoy & Castelló, 2003; Kirkim <i>et al.</i> , 2017; Larwood, 1940; Lorenti, 1994; Müller, 2006; Martínez-Laiz <i>et al.</i> , 2018; Müller, 1994; Negoescu, 1980a; Ramdane & Trilles, 2008;	Al-Zubaidy & Mhaisen, 2013; Barnard, 1936; Bruce & Jones, 1978; El-Komi <i>et al.</i> , 1998; Elshahawy & Desouky, 2012; Glynn, 1972; Hadfield & Smith, 2017; Jones & Nithyanandan, 2012; Kensley, 2001; Kirkim <i>et al.</i> , 2017; Larwood, 1954; Monod, 1933; Müller, 1989a,b, 1991, 1994; Negoescu, 1980b, 1981;
	<b>2. Western coasts of Italy and French Provence: Ligurian and Tyrrhenian Seas</b>	Amar, 1961; Argano <i>et al.</i> , 1995; Argano & Campanaro, 2010; Ateş <i>et al.</i> , 2010; George & Menzies, 1968; Grube, 1864; Holdich, 1970; Jones, 1969; Karaman, 1955; Larwood, 1940; Müller, 1994; Negoescu, 1980a; Radujković & Šundić, 2011; Ramdane & Trilles, 2008; Trilles, 1991; Trilles & Ökterner, 2004; Ulman <i>et al.</i> , 2017; Veuille, 1979;	Argano <i>et al.</i> , 1995; Argano & Campanaro, 2010; Artüz & Kubanç, 2015; Ateş <i>et al.</i> , 2004; Ayari, 2004; Ayari & Afli, 2003; Borg <i>et al.</i> , 2006; Chardy, 1974; Gavino, 1858-1859, 1873; George & Menzies, 1968; Holdich, 1970; Kavanagh <i>et al.</i> , 2006; Kirkim <i>et al.</i> , 2017; Larwood, 1940; Lorenti, 2006; Lucas, 1849; Mifsud, 2017; Monod, 1925; Müller, 1994; Müller, 2019; Mastry, 1970;
	<b>3. Eastern coasts of Italy: Adriatic Sea</b>	Argano & Campanaro, 2010; Holdich, 1970; Jones, 1969; Larwood, 1940; Leach, 1818; Madurell & Cartes, 2003; Müller, 1994; Negoescu, 1980a; Trilles, 1991; Ulman <i>et al.</i> , 2017; Veuille, 1979; Vieira <i>et al.</i> , 2016; WoRMS Editorial Board, 2019	Barnard, 1936; Eman <i>et al.</i> , 2014; Glynn, 1972; Kazmi & Yousouf, 2013; Kirkim <i>et al.</i> , 2017; Larwood, 1940, 1954; Monod, 1933; Müller, 1994; Negoescu, 1981; Omer-Cooper, 1927; Poore, 2001; Shoukr <i>et al.</i> , 1991; Trilles, 1991; Trilles <i>et al.</i> , 1999; WoRMS Editorial Board, 2019
	<b>4. Eastern coasts of Italy: Ionian Sea</b>	Artüz & Kubanç, 2015; Ateş <i>et al.</i> , 2006; Bakir, 2012; Bakir & Katagan, 2005; Bakir <i>et al.</i> , 2014; Chardy, 1974; Çinar <i>et al.</i> , 2002; Çinar <i>et al.</i> , 2008; Colombo, 1885; Dounas & Koukouras, 1986; Geldiay & Kocataş, 1972; George & Menzies, 1968; Holdich, 1970; Jones, 1969; Kirkim <i>et al.</i> , 2009; Kirkim <i>et al.</i> , 2017; Kopuz <i>et al.</i> , 2011; Kvaach, 2009;	Argano <i>et al.</i> , 1995; Argano & Campanaro, 2010; Artüz & Kubanç, 2015; Ateş <i>et al.</i> , 2004; Ayari, 2004; Ayari & Afli, 2003; Borg <i>et al.</i> , 2006; Chardy, 1974; Gavino, 1858-1859, 1873; George & Menzies, 1968; Holdich, 1970; Kavanagh <i>et al.</i> , 2006; Kirkim <i>et al.</i> , 2017; Larwood, 1940; Lorenti, 2006; Lucas, 1849; Mifsud, 2017; Monod, 1925; Müller, 1994; Müller, 2019; Mastry, 1970;
	<b>5. Aegean and Marmara Seas</b>	Artüz & Kubanç, 2015; Ateş <i>et al.</i> , 2006; Bakir, 2012; Bakir & Katagan, 2005; Bakir <i>et al.</i> , 2014; Chardy, 1974; Çinar <i>et al.</i> , 2002; Çinar <i>et al.</i> , 2008; Colombo, 1885; Dounas & Koukouras, 1986; Geldiay & Kocataş, 1972; George & Menzies, 1968; Holdich, 1970; Jones, 1969; Kirkim <i>et al.</i> , 2009; Kirkim <i>et al.</i> , 2017; Kopuz <i>et al.</i> , 2011; Kvaach, 2009;	Argano <i>et al.</i> , 1995; Argano & Campanaro, 2010; Artüz & Kubanç, 2015; Ateş <i>et al.</i> , 2004; Ayari, 2004; Ayari & Afli, 2003; Borg <i>et al.</i> , 2006; Chardy, 1974; Gavino, 1858-1859, 1873; George & Menzies, 1968; Holdich, 1970; Kavanagh <i>et al.</i> , 2006; Kirkim <i>et al.</i> , 2017; Larwood, 1940; Lorenti, 2006; Lucas, 1849; Mifsud, 2017; Monod, 1925; Müller, 1994; Müller, 2019; Mastry, 1970;
	<b>6. Black Sea</b>	Akbulut <i>et al.</i> , 2009; Artüz & Kübañç, 2015; Bacescu, 1948, 1958; Bakir <i>et al.</i> , 2014; George & Menzies, 1968; Gönllüçür-Demirel, 2006; Holdich, 1970; Jones, 1969; Kirkim <i>et al.</i> , 2009; Kirkim <i>et al.</i> , 2017; Kopuz <i>et al.</i> , 2011; Kvaach, 2009;	Argano <i>et al.</i> , 1995; Argano & Campanaro, 2010; Artüz & Kubanç, 2015; Ateş <i>et al.</i> , 2004; Ayari, 2004; Ayari & Afli, 2003; Borg <i>et al.</i> , 2006; Chardy, 1974; Gavino, 1858-1859, 1873; George & Menzies, 1968; Holdich, 1970; Kavanagh <i>et al.</i> , 2006; Kirkim <i>et al.</i> , 2017; Larwood, 1940; Lorenti, 2006; Lucas, 1849; Mifsud, 2017; Monod, 1925; Müller, 1994; Müller, 2019; Mastry, 1970;
	<b>7. Levant Sea: Southern Turkey, Cyprus, Syria, Lebanon, Israel, and Egypt</b>	Al-Zahaby <i>et al.</i> , 2001; Amar, 1957; Atta, 1991; Bakir <i>et al.</i> , 2014; Bariche & Trilles, 2005, 2006; Castelló, 2017b; George & Menzies, 1968; Glynn, 1972; Holdich, 1970; Horton <i>et al.</i> , 2005; Kirkim <i>et al.</i> , 2009, 2015; Kirkim <i>et al.</i> , 2010; Kirkim <i>et al.</i> , 2017; Koçatas <i>et al.</i> , 2001; Koukouras <i>et al.</i> , 2002; Larwood, 1940; Mahmoud <i>et al.</i> , 2019; Mastry, 1970;	Argano <i>et al.</i> , 1995; Argano & Campanaro, 2010; Artüz & Kubanç, 2015; Ateş <i>et al.</i> , 2004; Ayari, 2004; Ayari & Afli, 2003; Borg <i>et al.</i> , 2006; Chardy, 1974; Gavino, 1858-1859, 1873; George & Menzies, 1968; Holdich, 1970; Kavanagh <i>et al.</i> , 2006; Kirkim <i>et al.</i> , 2017; Larwood, 1940; Lorenti, 2006; Lucas, 1849; Mifsud, 2017; Monod, 1925; Müller, 1994; Müller, 2019; Mastry, 1970;
	<b>8. Algeria, Tunisia, Libya, and Malta</b>	Argano <i>et al.</i> , 1995; Argano & Campanaro, 2010; Artüz & Kubanç, 2015; Ateş <i>et al.</i> , 2004; Ayari, 2004; Ayari & Afli, 2003; Borg <i>et al.</i> , 2006; Chardy, 1974; Gavino, 1858-1859, 1873; George & Menzies, 1968; Holdich, 1970; Kavanagh <i>et al.</i> , 2006; Kirkim <i>et al.</i> , 2017; Larwood, 1940; Lorenti, 2006; Lucas, 1849; Mifsud, 2017; Monod, 1925; Müller, 1994; Müller, 2019; Mastry, 1970;	Argano <i>et al.</i> , 1995; Argano & Campanaro, 2010; Artüz & Kubanç, 2015; Ateş <i>et al.</i> , 2004; Ayari, 2004; Ayari & Afli, 2003; Borg <i>et al.</i> , 2006; Chardy, 1974; Gavino, 1858-1859, 1873; George & Menzies, 1968; Holdich, 1970; Kavanagh <i>et al.</i> , 2006; Kirkim <i>et al.</i> , 2017; Larwood, 1940; Lorenti, 2006; Lucas, 1849; Mifsud, 2017; Monod, 1925; Müller, 1994; Müller, 2019; Mastry, 1970;
	<b>9. Suez Canal</b>	Argano <i>et al.</i> , 1995; Argano & Campanaro, 2010; Artüz & Kubanç, 2015; Ateş <i>et al.</i> , 2004; Ayari, 2004; Ayari & Afli, 2003; Borg <i>et al.</i> , 2006; Chardy, 1974; Gavino, 1858-1859, 1873; George & Menzies, 1968; Holdich, 1970; Kavanagh <i>et al.</i> , 2006; Kirkim <i>et al.</i> , 2017; Larwood, 1940; Lorenti, 2006; Lucas, 1849; Mifsud, 2017; Monod, 1925; Müller, 1994; Müller, 2019; Mastry, 1970;	Argano <i>et al.</i> , 1995; Argano & Campanaro, 2010; Artüz & Kubanç, 2015; Ateş <i>et al.</i> , 2004; Ayari, 2004; Ayari & Afli, 2003; Borg <i>et al.</i> , 2006; Chardy, 1974; Gavino, 1858-1859, 1873; George & Menzies, 1968; Holdich, 1970; Kavanagh <i>et al.</i> , 2006; Kirkim <i>et al.</i> , 2017; Larwood, 1940; Lorenti, 2006; Lucas, 1849; Mifsud, 2017; Monod, 1925; Müller, 1994; Müller, 2019; Mastry, 1970;

continued



