



**MSFD Guiding
Improvements in the Black
Sea
Integrated Monitoring
System**



List of NON-NATIVE ZOOBENTHOS Species from the Black Sea

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Abbreviations used:

Black Sea countries	
BG	BULGARIA
GE	GEORGIA
RO	ROMANIA
RU	RUSSIAN FEDERATION
TR	TURKEY
UA	UKRAINE

Origin of exotic species	
NA	North America
BS	Black Sea
MS	Mediterranean Sea
NE	North Europe
AO	Atlantic Ocean
MS	Mediterranean Sea
PO	Pacific Ocean
IO	Indian Ocean
EW	European water bodies
Co	Cosmopolitan
SE	South-Eastern Asia
Au	Australia
Af	African water bodies
CS	Caspian Sea

Establishment success	
C	casual
E	established
Q	questionable

Each species description includes the following information:

- o Year of the first occurrence in national waters;
- o Place of the first occurrence in national waters;

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Background

In the Transboundary Diagnostic Report prepared for the Black Sea in 2007, the non-native species, especially the invasive ones were recognized as a serious threat to the marine environment. This fact was possible on one hand due to the semi-enclosed status of the Black Sea, very sensitive to biological invasions and on the other hand to the increased shipping traffic, aquaculture development and trade. Non-native species can cause irreversible environmental impact at different levels (genetic, species, environment) in ways that cause significant damage to the goods and services provided by the marine ecosystem. In a decade (1996-2005) a total of 48 non-native species were recorded in the Black Sea, representing over 22% of all registered species. Out of these, 15 are zoobenthic. Among them there are highly species invasive that significantly impacted the native zoobenthic communities such as Japanese whelk *Rapana venosa* that eliminated entire populations of bivalves. As a result of this assessment, in the Black Sea Strategic Action Plan 2009, three management targets aiming to reduce human-mediated species introduction were considered.

Recent enforcement of the Protocol on the Conservation of the Black Sea Biodiversity and Landscapes (2011) reiterated the problem of the non-native species, which should be a priority for the decision-makers considering the increasing number of species registered in the last decade.

The list of non-native zoobenthic species presented below contains 63 species which were identified in the entire Black Sea. The list should be updated regularly and the species recognized with high invasive potential must be carefully monitored.

Pictures of Black Sea Non-Native Zoobenthos Species

Class TUBOTHALAMEA

1. *Sorites orbiculus* (Ehrenberg, 1905)

Subfamily: Soritinae
Family: Soritidae
Superfamily: Soritoidea
Suborder: Miliolina
Order: Miliolida

Class HIDROZOA

2. *Blackfordia virginica* (Mayer, 1910);
Syn. Eugenia cimmeria (Iliyn, 1930)

Family: Blackfordiidae
Order: Leptothecata
Subclass: Hydroidolina



3. *Garveia franciscana* (Torrey, 1902)
Syn. Perigonimus megas (Kinne, 1956)
Bougainvillia muscus (Van Beneden, 1844);
<http://www.gaiaguide.info/Group.html?groupId=YXqCJDH5>

Family: Bougainvilliidae
Suborder: Filifera
Order: Anthoathecata
Subclass: Hydroidolina



4. *Tiaropsis multicirrata* (M.Sars, 1835)

(<http://www.marinespecies.org/hydrozoa/aphia.php?p=image&pic=5677>)

Family: Tiaropsidae

Order: Leptothecata

Subclass: Hydroidolina

Class ANTHOZOA



5. *Diadumene lineata* (Verrill, 187)

Syn. Haliplanella luciae (Verrill, 1898)

(<http://bio.biologists.org/content/1/6.cover-expansion>)

Family: Diadumenidae

Suborder: Nynantheae

Order: Actiniaria

Subclass: Hexacorallia

Phylum ANNELIDA

Class POLYCHAETA

6. *Sigambra tentaculata* (Treadwell, 1941)

Syn. Ancistrosyllis tentaculata Treadwell, 1941

Family: Pilargidae

Suborder: Nereidiformia

Order: Phyllodocida

Subclass: Errantia



7. *Dipolydora quadrilobata* (Jacobi, 1883)
<http://www.iopan.gda.pl/projects/Polychaeta/list/DipQua.html>

Family: Spionidae
Suborder: Spioniformia
Order: Spionida
Subclass: Sedentaria



8. *Ficopomatus enigmaticus* (Fauvel, 1923)
Syn. Mercierella enigmatica (Fauvel, 1923)
http://www.exoticguide.org/ficopomatus_enigmaticus

Family: Serpulidae
Order: Sabellida
Subclass: Sedentaria



9. *Hydroides dianthus* (Verill, 1873)
http://www.whoi.edu/science/B/people/sbeaulieu/teaching/polychaetes_L3.html

Family: Serpulidae
Order: Sabellida
Subclass: Sedentaria



10. *Magelona mirabilis* (Johnston, 1845)
 Syn. *M. papillicornis* (Muller 1858)
<http://www.genustrait handbook.org.uk/genus/magelona/>

Family: Magelonidae
Suborder: Spioniformia
Order: Spionida
Suclass: Sedentaria



11. *Polydora cornuta* (Bosc, 1802)
 (was identified firstly as *Polydora limicola*)
<http://www.annelida.net/nz/Polychaeta/Family/Spionidae/polydora-cornuta-Pic.htm>

Family: Spionidae
Suborder: Spioniformia
Order: Spionida
Subclass: Sedentaria



12. *Polydora websteri* (Hartman in Loosanoff & Engle, 1943)
http://marine1.bio.sci.toho-u.ac.jp/tokyobay/ikimono/index.html?page=bio_4.html

Family: Spionidae
Suborder: Spioniformia
Order: Spionida
Subclass: Sedentaria

13. *Prionospio pulchra* (Imajima, 1990)

Family: Spionidae
Suborder: Spioniformia
Order: Spionida
Subclass: Sedentaria

	14. <i>Streblospio gynobranchiata</i> (Rice et Levin, 1998) Family: Spionidae Suborder: Spioniformia Order: Spionida Subclass: Sedentaria
Class CLITELLATA	
	15. <i>Tubificoides benedii</i> (Udekem, 1855) http://www.biopix.dk/jcs/Dyr/SpeciesPages/TubifBened.htm Subfamily: Tubificinae Family: Tubificidae Suborder: Tubificina Order: Haplotaxida Subclass: Oligochaeta
Phylum MOLLUSCA Class GASTROPODA	
	16. <i>Aporrhais pespelecani</i> (Linne, 1758) http://www.gastropods.com/2/Shell_282.shtml Family: Aporrhaidae Order: Littorinimorpha Subclass: Caenogastropoda



17. *Corambe obscura* (Verrill, 1870)
 Syn. *Doridella obscura* (Verrill, 1870)
[\(http://ecomareaneagra.wordpress.com/\)](http://ecomareaneagra.wordpress.com/)

Family: Onchidorididae
Suborder: Euctenidiacea
Order: Nudibranchia
Subclass: Heterobranchia



18. *Ercolania viridis* (A. Costa, 1866)
 Syn. *E. funerea* (A. Costa, 1867)
<http://www.jaxshells.org/vird.htm>

Family: Limapontiidae
Suborder: Plakobranchacea
Order: Sacoglossa
Subclass: Heterobranchia



19. *Barbitonia arthritica* (Valenciennes, 1858)
 Syn. *Neptunea arthritica* (Bernardi, 1857)
 (was identified firstly as *Purpura pacifica*)
<http://www.conchology.be>

Family: Buccinidae
Order: Neogastropoda
Subclass: Caenogastropoda

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20. *Rapana venosa* (Valenciennes, 1846)
Syn. Rapana thomasiana thomasiana (Crosse, 1861);
 Photo. Valeria Abaza

Subfamily: Rapaninae
Family: Muricidae
Order: Neogastropoda
Subclass: Caenogastropoda



21. *Trinchesia perca* (Er. Marcus, 1958)
<http://www.seaslugforum.net/showall/cuthbarb>

Family: Tergipedidae
Order: Nudibranchia

Class BIVALVIA



22. *Anadara inaequalis* (Bruguère, 1789)
 Photo Adrian Filimon

Family: Arcidae
Order: Arcoida
Subclass: Pteriomorphia



23. *Anadara kagoshimensis* (Tokunaga, 1906)

(http://www.nmr-pics.nl/Arcidae_new2/album/)

Family: Arcidae

Order: Arcoida

Subclass: Pteriomorphia



24. *Crassostrea gigas* (Thunberg, 1793)

(<http://naturalhistory.museumwales.ac.uk/britishbivalves/browse/record.php?-recid=216>)

Family: Ostreidae

Order: Ostreoida

Subclass: Pteriomorphia

Crassostrea virginica



25. *Crassostrea virginica* (Gmelin 1791)

(<http://www.uniprot.org/taxonomy/6565>)

Family: Ostreidae

Order: Ostreoida

Subclass: Pteriomorphia

	26. <i>Arcuatula senhousia</i> (Benson in Cantor, 1842) Syn. <i>Musculista senhousia</i> (Benson in Cantor, 1842) http://www.elrincondelmalacologo.com/Web%20fotos%20marinos%20no%20gasteropodos/Mytilidae.htm Family: Mytilidae Order: Mytiloida Subclass: Pteriomorphia
	27. <i>Mya arenaria</i> (Linné, 1758) http://www.dfw.state.or.us/mrp/shellfish/bayclams/index.asp Family: Myidae Order: Myoida Subclass: Heterodonta
	28. <i>Mytilus edulis</i> (Linnaeus, 1758) http://commons.wikimedia.org/wiki/File:Mytilus_edulis_01.JPG Family: Mytilidae Order: Mytiloida Subclass: Pteriomorphia
	29. <i>Mytilus trossulus</i> (Gould, 1850) http://www.bily.com/pnwsc/web-content/Bivalve%20Identification.html Family: Mytilidae Order: Mytiloida Subclass: Pteriomorphia

	30. <i>Pteria hirundo</i> (Linne, 1758) (http://www.marevita.org/) Family: Pteriidae Order: Pterioida Subclass: Pteriomorphia
	31. <i>Ruditapes philippinarum</i> (Adams and Reeve 1850) <i>Syn. Venerupis philippinarum</i> (Adams and Reeve 1850) http://www.fegi.ru/prim/sea/m_dvu18.htm Family: Veneridae Order: Veneroidea Subclass: Heterodonta
	32. <i>Teredo navalis</i> (Linne, 1758) http://www.cienciatk.csic.es/Fotografias/TEREDO+NAVALIS+(BROMA,+BIVALVOS)+Proyecto+Fauna+Iberica_13662.html Family: Teredinidae Order: Myoidea Subclass: Heterodonta
Subphylum CRUSTACEA Class MAXILLOPODA	
	33. <i>Amphibalanus amphitrite</i> (Darwin, 1854) http://www.biodiversitysnapshots.net.au/bdrs-core/public/speciesInfo.htm?spid=803&mode=fieldguide Family: Balanidae Suborder: Balanomorpha Order: Sessilia Subclass: Thecostraca



34. *Amphibalanus improvisus* (Darwin, 1854)

Photo: Valeria Abaza

Family: Balanidae

Suborder: Balanomorpha

Order: Sessilia

Subclass: Thecostraca



35. *Amphibalanus eburneus* (Gould, 1841)

(<http://marinedebrisinsingapore.blogspot.ro/2011/02/barnacle-sorting-updated.html>)

Family: Balanidae

Suborder: Balanomorpha

Order: Sessilia

Subclass: Thecostraca

36. *Archesola typhlops* (Sars, 1920)

Family: Laophontidae

Order: Harpacticoida

Subclass: Copepoda

37. *Darcythompsonia fairlensis* (T. Scott, 1899)

Family: Darcythompsoniidae

Order: Harpacticoida

Subclass: Copepoda

38. *Sarsamphiascus parvus* (Sars, 1906), Huys, 2009

Family: Miraciidae

Order: Harpacticoida

Subclass: Copepoda

39. *Sarsamphiascus tenuiremis* (Brady, 1880)

Syn. *Amphiascus tenuiremis* (Brady & Robertson D., 1880)

Family: Miraciidae

Order: Harpacticoida

Subclass: Copepoda

	40. <i>Sarsameira parva</i> (Boeck, 1873) Family: Ameiridae Order: Harpacticoida Subclass: Copepoda
	41. <i>Leptomesochra tenuicornis</i> (Sars G.O., 1911) Family: Ameiridae Order: Harpacticoida Subclass: Copepoda
	42. <i>Paramphiascella vararensis</i> (T Scott, 1903) Subfamily: Diosaccinae Family: Miraciidae Order: Harpacticoida Subclass: Copepoda
	43. <i>Phyllopodosyllus bradii</i> (T. Scott, 1892) Order: Harpacticoida Subclass: Copepoda
	44. <i>Proameira simplex</i> (Norman & T Scott, 1905) Syn. <i>Ameira simplex</i> Family: Ameiridae Order: Harpacticoida Subclass: Copepoda
	45. <i>Robertgurneya ecaudata</i> (Monard, 1936) Subfamily: Diosaccinae Family: Miraciidae Order: Harpacticoida Subclass: Copepoda
	46. <i>Robertgurneya rostrata</i> (Gurney, 1927) Syn. <i>Amphiascus rostratus</i> (Gurney, 1927) Subfamily: Diosaccinae Family: Miraciidae Order: Harpacticoida Subclass: Copepoda
	47. <i>Tachidiella minuta</i> (Sars G.O., 1909) Family: Idyanthidae Order: Harpacticoida Subclass: Copepoda

Class MALACOSTRACA



48. *Saduria (Mesidotea) entomon* (Linnaeus, 1758)

(<http://www.agefotostock.com/en/Stock-Images/Rights-Managed/BWI-BLW025240>)

Family: Chaetiliidae

Order: Isopoda

Subclass: Eumalacostraca



49. *Sphaeroma walkeri* (Stebbing, 1905)

(<http://www.swims.hku.hk/nonnative%20webpage/walkeri.dwt>)

Family: Sphaeromatidae

Suborder: Sphaeromatidea

Order: Isopoda

Subclass: Eumalacostraca



50. *Alpheus dentipes* (Guerin-Meneville, 1832)

(http://biogeodb.stri.si.edu/bioinformatics/alpheus/Alpheus_Template.php?species=dentipes)

Family: Alpheidae

Order: Decapoda

Subclass: Eumalacostraca



51. *Callinectes sapidus* (Rathbun, 1896)

(<http://www.nature-of-oz.com/crustacea.htm>)

Subfamily: Portuninae

Family: Portunidae

Order: Decapoda

Subclass: Eumalacostraca

Callinectes sapidus (Rathbun, 1896)

צילום: ד"ר רותם כהן



52. *Eriocheir sinensis* (Milne-Edwards, 1853)

(<http://www.rimeis.org/species/images/es1.jpg>)

Subfamily: Varuninae

Family: Varunidae

Order: Decapoda

Subclass: Eumalacostraca



53. *Hemigrapsus sanguineus* (de Haan, 1835)

(<http://www.clarku.edu/departments/biology/biol201/2004/bwhitman/hemigrapsus.htm>)

Subfamily: Varuninae

Family: Varunidae

Order: Decapoda

Subclass: Eumalacostraca



54. *Palaemon macrodactylus* (Rathbun, 1902)

(<http://researcharchive.calacademy.org/research/izg/SFBay2K/Palaemon%20macrodactylus.htm>)

Subfamily: Palaemoninae

Family: Palaemonidae

Order: Decapoda

Subclass: Eumalacostraca



55. *Pandalus latirostris* (Rathbun, 1902)
 Syn. *Pandalus kessleri* (Czerniavsky, 1878)
<http://fishretail.ru/fishbook/details?id=428>

Family: Pandalidae
Order: Decapoda
Subclass: Eumalacostraca



56. *Penaeus semisulcatus* (De Haan, 1844)
<http://pages.fis.com/coralexport>

Family: Penaeidae
Suborder: Dendrobranchiata
Order: Decapoda
Subclass: Eumalacostraca

57. *Penaeus japonicus* (Spence Bate, 1888)
 Syn. *Marsupenaeus japonicus* (Spence Bate, 1888)

Family: Penaeidae
Suborder: Dendrobranchiata
Order: Decapoda
Subclass: Eumalacostraca



58. *Rhitropanopeus harrisi tridentatus* (Maitland, 1874)

Photo: Valeria Abaza

Family: Panopeidae

Order: Decapoda

Subclass: Eumalacostraca



59. *Sirpus zariquieyi* (Gordon, 1953)

(<http://photo.sci-lib.com/photo164.html>)

Family: Pirimelidae

Order: Decapoda

Subclass: Eumalacostraca

Phylum ECHINODERMATA

Class ASTEROIDEA



60. *Asterias rubens* Linnaeus, 1758

(<http://www.marlin.ac.uk/speciesfullreview.php?speciesID=2657>)

Family: Asteriidae

Order: Forcipulatida

Subphylum TUNICATA

Class ASCIDIACEA



61. *Molgula manhattensis* (De Kay 1843)

(<http://researcharchive.calacademy.org/research/izg/SFBay2K/Molgula%20manhattensis.htm>)

Family: Molgulidae

Order: Stolidobranchia



62. *Styela clava* (Herdmann, 1881)

(<http://researcharchive.calacademy.org/research/izg/SFBay2K/Styela%20clava.htm>)

Family: Styelidae

Order: Stolidobranchia

Phylum ENTOPROCTA

63. *Urnatella gracilis* (Leidy, 1851)

Family: Barentsiidae

Order: Coloniales

List of Zoobenthos Non-Native Species

Taxa	Year and place of the First Occurrence in National Waters						Source	Native range (Origine)	Establishment success
	BG	GE	RO	RU	TR	UA			
<i>Alpheus dentipes</i> Guerin-Meneville, 1832	1966 Shelf area						[8, 48]	MS, AO	Q
<i>Amphibalanus amphitrite</i> Darwin, 1854 Syn. <i>Balanus amphitrite</i> (Darwin, 1854)			1844 Shelf area			1905 Odessa port area	[2,48]	MS, AO	Q
<i>Amphibalanus eburneus</i> (Gould, 1841) Syn. <i>Balanus eburneus</i> Gould, 1841					1968 Turkish Black Sea	1892 (Sevastopol Bay)	[2, 38, 48]	AO, NA	E
<i>Amphibalanus improvisus</i> (Darwin, 1854) Syn. <i>Balanus improvisus</i> (Darwin, 1854)	1844 Shelf area	1978-1982 Chorokhi-Gudauta shelf	1844 Shelf area	?	2005 Prebosphoric area	1844 Shelf area	[2, 13, 34, 48, 52, 57]	MS, AO, NA	E
<i>Anadara inaequalis</i> (Bruguière, 1789) Syn <i>Arca inaequalis</i> (Bruguière, 1789); <i>Scapharca inaequalis</i> (Bruguière): Ghisotti & Rinaldi, 1976	1982 Varna Bay, Bourgaz Bay	1978 Coastal zone	1984 North Mamaia	1980s Kerch Strait area; SA	1980s Near Bosphorus	1987; 1989 Kerch Strait area; SA	[2, 12, 13, 48, 57]	PO, SE, IO	E
<i>Anadara kagoshimensis</i> (Tokunaga, 1906)					2003 Near Bosphorus		[1]	IO, PO	Q
<i>Ancistrosyllis tentaculata</i> Treadwell, 1941 Syn. <i>Sigambra tentaculata</i> (Treadwell, 1941)		1978 Coastal zone				1964 Crimea coast	[17, 33]	AO	Q
<i>Aporrhais pespelecani</i> (Linne, 1758)		1960 Batumi Coastal area			1896 Pribosphoric area	19 Crimea: Sudak Bay 87	[2, 4, 35]	MS	Q
<i>Archesola typhlops</i> (Sars, 1920)			?			2007 Northwestern part of the BS	[20]	NE	Q
<i>Asterias rubens</i> Linnaeus, 1758					2003 Prebosphoric area		[16]	AO	E
<i>Blackfordia virginica</i> (Mayer, 1910); Syn. <i>Eugenia cimmaria</i> Iliyn, 1930; <i>Campanulina pontica</i> Valkanov, 1936	1925 River mouths near Burgas (Bulgaria)		1940 Port Constantza			2001 Odessa port area	[2, 48, 53]	NA	E
<i>Callinectes sapidus</i> (Rathbun, 1896)	1967 Shelf area	1975	1998 Southern Littoral	1970s Kerch Strait		1970s Kerch Strait	[2, 24, 48]	NA	E
<i>Corambe obscura</i> (Verrill, 1870) Syn. <i>Doridella obscura</i> (Verrill, 1870)	1986 Varna Bay		1990			1989 Laspi Bay in Crimea	[14, 48, 53]	NA	E
<i>Crassostrea gigas</i> (Thunberg, 1793)			2003 Southern Littoral			1900s Sevastopol Bay	[2, 48]	SE	E
<i>Crassostrea virginica</i> (Gmelin 1791)			1973 Southern Littoral				[48, 56]	NA, NE	Q
<i>Darcythompsonia fairlensis</i> (T. Scott, 1899)						2009 Crime: Karadag area	[22]	MS, AO, IO, PO (circumtropical)	E
<i>Diadumene lineata</i> Verrill, 1871 Syn . <i>Haliplanella luciae</i> (Verrill, 1898)	1960s Coastal zone		1960s Coastal zone			1960s Coastal zone	[5, 23, 48]	PO	E
<i>Dipolydora quadrilobata</i> Jacobi, 1883	1990s Shelf area		2000s In front of Sf.Gheorghe mouth of Danube				[6 ,48, 50]	MS, AO, PO	Q
<i>Ercolania viridis</i> (A. Costa, 1866) Syn. <i>E. funerea</i> (A. Costa, 1867)						2001 Odessa port area	[2, 48]	NA,AO	Q

Taxa	Year and place of the First Occurrence in National Waters						Source	Native range (Origine)	Establishment success
	BG	GE	RO	RU	TR	UA			
<i>Eriocheir sinensis</i> (Milne-Edwards, 1853)			1934, 1997 Musura Bay (Sulina)			1998, 2005 NWBS: port Yuzhny area + SA; Crime: Sevastopol Bay	[2, 48, 53]	SE	E
<i>Ficopomatus enigmaticus</i> (Fauvel, 1923) Syn. <i>Mercierella enigmatica</i> Fauvel, 1923	1935 Mandrensko Lake, Ropotamo river mouth	1929 Paleostomi Lake	1954 Coastal waters	1961 Kerch port area	2004 Sinop area	1961 Kerch port area	[2, 3, 11, 30, 39, 43, 46, 48, 51]	SE	E
<i>Garveia franciscana</i> Torrey, 1902 Syn. <i>Perigonimus megas</i> (Kinne, 1956) <i>Bougainvillia muscus</i> (Van Beneden, 1844);	1933 Varna Lake			1950s Kerch Strait		1950s Azov Sea: Kerch Strait, Mariupol port	[2, 45, 53]	AO	E
<i>Hemigrapsus sanguineus</i> (de Haan, 1835)			2008 Constanta cost, Romania				[32]	PO, SE	E
<i>Hydroides dianthus</i> (Verill, 1873)						2009 Sevastopol	[7]	AO	Q
<i>Leptomesochra tenuicornis</i> Sars G.O., 1911				1999 Anapa and Novorossiysk area			[54]	NE	C
<i>Magelona mirabilis</i> (Johnston, 1845) Syn. <i>M. papillicornis</i> (Muller 1858)						1997 ?	[36]	MS, AO	Q
<i>Marsupenaeus japonicus</i> (Spence Bate 1888)						1960-1970s ?	[53]	SE	C
<i>Molgula manhattensis</i> (De Kay 1843)			1971 Coastal water bodies, Raselm Lagoon				[5, 48]	NA, NE	Q
<i>Arcuatula senhousia</i> (Benson in Cantor, 1842) Syn. <i>Musculista senhousia</i> (Benson in Cantor, 1842)			2002 Coastal water bodies, Raselm Lagoon				[27, 28]	PO	Q
<i>Mya arenaria</i> (Linné, 1758)	1973 Burgas Bay, Marinka river inflow		1968 Coastal water bodies, Raselm Lagoon		2005 Prebosphoric area	1966 Odessa Gulf	[2, 15, 48, 57]	NA	E
<i>Mytilus edulis</i> Linnaeus, 1758					1990 Turkish Black Sea	2001 Odessa port area	[2, 48]	AO	Q
<i>Mytilus trossulus</i> Gould, 1850						2001 Odessa port area	[2, 48]	PO	E
<i>Neptunea arthritica</i> (Bernardi, 1857) (was identified firstly as <i>Purpura pacifica</i>)	2000 Shelf area					2000 Crime: Kamyshevaya Bay	[2, 48]	PO, IO	Q
<i>Palaemon macrodactylus</i> Rathbun, 1902	2009 Varna Lake		2008 Litoral zone				[31, 41]	PO, SE	E
<i>Pandalus kessleri</i> Czerniavsky, 1878 Syn. <i>P. latirostris</i>					1959 Kyzyltash limans	1959 Ukrainian part of the NWB: Khadzhibeysky liman	[48, 53]	SE	C

Taxa	Year and place of the First Occurrence in National Waters						Source	Native range (Origine)	Establishment success
	BG	GE	RO	RU	TR	UA			
<i>Paramphiascella vararensis</i> (T. Scott, 1903)						1969 Yalta coastal zone area	[19, 48]	AO, PO	Q
<i>Penaeus semisulcatus</i> De Haan, 1844				2005 Coastal area near Sochi			[9]	PO, IO	Q
<i>Phyllopodopsyllus bradii</i> (T. Scott, 1892)						1969 Yalta coastal zone area	[19, 48]	AO, NE	Q
<i>Polydora cornuta</i> Bosc, 1802 (was identified firstly as <i>Polydora limicola</i>)	1962 Shelf area		2005 NWBS	2009 Tuapse area		1962 NWBS: Sukhoy liman, Illychevsk port area	[2, 42, 46, 48]	Co	E
<i>Polydora websteri</i> Hartman in Loosanoff & Engle, 1943			1990s Coastal waters				[48]	PO	Q
<i>Prionospio pulchra</i> Imajima, 1990					2000 ?		[10]	PO	E
<i>Proameira simplex</i> (Norman & T. Scott, 1905) <i>Ameira simplex</i>						1969 Yalta coastal zone area	[19, 48]	MS, AO, PO	Q
<i>Pteria hirundo</i> (Linne, 1758)			2002 Coastal waters				[48]	MS	Q
<i>Rapana venosa</i> (Valenciennes, 1846) <i>Rapana thomasi</i> thomasi Crosse, 1861; <i>R. bezoar</i> L.	1956 Varna Bay	1947 Gudauta Coast	1963 Coastal waters	1946 Novorossiysky Bay	1960 Turkish Black Sea	1954 Crimea coast: Yalta, Sevastopol	[2, 48, 13]	SE	E
<i>Rhitropanopeus harrisi ridentate</i> (Maitland, 1874)	1934		1950 Razelm-Sinoe lagoon			1937 Dnieper-Bug liman	[2, 13, 48]	NA, NE	E
<i>Robertgurneya ecaudata</i> (Monard, 1936)						1969 Yalta coastal zone area	[19, 48]	AO	Q
<i>Robertgurneya rostrata</i> (Gurney, 1927) <i>Amphiascus rostratus</i>					2009 Sinop area	1969 Yalta coastal zone area	[19, 48]	AO, PO	Q
<i>Ruditapes philippinarum</i> (Adams and Reev, 1850) <i>Venerupis philippinarum</i> (Adams and Reev, 1850)			1985 Coastal area	1985 Caucasian coast			[48]	IO, PO, SE	C
<i>Saduria</i> (=Mesidotea) <i>entomon</i> (Linnaeus, 1758)						2009 NWBS coast	[18]	NE	Q
<i>Sarsameira parva</i> (Boeck, 1872)					2009 Bosporus area		[21]	NE	Q
<i>Sarsamphiascus parvus</i> (Sars, 1906) Huys, 2009							[54]	NE	Q
<i>Sarsamphiascus tenuiremis</i> (Brady, 1880)				1999 Anapa and Novorossiysk area		1996 Crimea coastal zone:Laspybight	[2, 48, 54]	NE	C
<i>Sirpus zariqeyi</i> Gordon, 1953					1982 BS coastal zone (Rize)		[53]	AO	Q
<i>Sorites orbiculus</i> Ehrenberg, 1839					2010 Turkish Black Sea		[26]	AO, IO, PO (circumtropical)	Q

Taxa	Year and place of the First Occurrence in National Waters						Source	Native range (Origine)	Establishment success
	BG	GE	RO	RU	TR	UA			
<i>Sphaeroma walkeri</i> Stebbing, 1905			2004 Coastal area				[47]	PO, IO	Q
<i>Streblospio gynobranchiata</i> Rice et Levin, 1998			2011 Mangalia Coastal area	2001 Novorossiysky Bay			[37, 40, 49]	NA	Q
<i>Styela clava</i> (Herdmann, 1881)			2004 Constanca port				[30]	NA	Q
<i>Tachidiella minuta</i> G. O. Sars, 1909					2009 Bosporus area		[21]	AO, NE	Q
<i>Teredo navalis</i> (Linne, 1758)	750-500 B.C. Shelf area		750-500 B.C. Shelf area		2007 Turkish Black Sea	750-500 B.C. NWBS	[2, 48, 53]	NA, NE	E
<i>Trinchesia perca</i> (Er. Marcus, 1958)						2007 Crimea (Chernaya River Estuary)	[25]	NA	Q
<i>Tiaropsis multicirrata</i> (M.Sars, 1835)						1990-s Crimea: Sevastopol Bay	[2, 48]	NA, NE	Q
<i>Tubificoides benedii</i> (Udekem, 1855)						1916 Odessa Gulf	[44]	NA	E
<i>Urnatella gracilis</i> Leidy, 1851; <i>U. dnistriensis</i> Zambriborsch, 1958			1950 Danube rivermouth area	1950 Don rivermouth area		1950 Dniester and Dnieper-Bug liman	[2, 13,48]	NA	E

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