

Mediterranean Marine Science

Vol 12, No 2 (2011)



An updated review of alien species on the coasts of Turkey

M.E. CINAR, M. BILECENOGLU, B. OZTURK, T. KATAGAN, M.B. YOKES, V. AYSEL, E. DAGLI, S. ACIK, T. OZCAN, H. ERDOGAN

doi: [10.12681/mms.34](https://doi.org/10.12681/mms.34)

To cite this article:

CINAR, M., BILECENOGLU, M., OZTURK B., KATAGAN T., YOKES M., AYSEL, V., DAGLI, E., ACIK, S., OZCAN, T., & ERDOGAN, H. (2011). An updated review of alien species on the coasts of Turkey. *Mediterranean Marine Science*, 12(2), 257–315. <https://doi.org/10.12681/mms.34>

An updated review of alien species on the coasts of Turkey

M.E. ÇINAR¹, M. BILECENOĞLU², B. ÖZTÜRK¹, T. KATAĞAN¹, M.B. YOKEŞ³,
V. AYSEL⁴, E. DAĞLI¹, S. AÇIK⁵, T. ÖZCAN⁶ and H. ERDOĞAN⁴

¹Ege University, Faculty of Fisheries, Department of Hydrobiology, 35100 Bornova, Izmir, Turkey

²Adnan Menderes University, Faculty of Arts & Sciences, Department of Biology, 09010,
Aydın, Turkey

³Haliç University, Department of Molecular Biology and Genetics, Faculty of Arts and Sciences,
Siracevizler Cad. No:29, Şişli, 34381, Istanbul, Turkey

⁴Onsekiz Mart University, Faculty of Arts & Sciences, Department of Biology, Çanakkale, Turkey

⁵Dokuz Eylul University, Institute of Marine Sciences and Technology, Inciralti, 35340, Izmir, Turkey

⁶Department of Marine Biology, Faculty of Fisheries, Mustafa Kemal University, 31200 Iskenderun,
Hatay, Turkey

Corresponding author: melih.cinar@ege.edu.tr

Received: 02 March 2011; Accepted: 9 May 2011; Published on line: 30 May 2011

Abstract

This 2010 review of alien species along the coasts of Turkey represents a total of 400 alien species belonging to 14 systematic groups. The present paper also reports the first findings of *Vandorhorstia mertensi* in the Aegean Sea (Gökova Bay), *Chama adspersa* in the Sea of Marmara and *Mya arenaria* in the Aegean Sea. A total of 124 new alien species was determined within the last 5 years. Mollusca had the highest number of species (105 species), followed by Polychaeta (75 species), Crustacea (64 species) and Pisces (58 species). The highest number of alien species (330 species) were encountered on the Levantine coast of Turkey, followed by the Aegean Sea (165 species), Sea of Marmara (69 species) and Black Sea (20 species). The Suez Canal (66% of the total number of alien species) is the main vector for species introductions to the coasts of Turkey, followed by the ship-mediated transport (30%). The majority of species (306 species, 76% of total number of species) have become established in the area, while 59 species are classified as casual (15%), 23 species as questionable (6%) and 13 species as cryptogenic (3%). One new alien species was introduced to the coasts of Turkey every 4 weeks between 1991 and 2010. The majority of aliens were found on soft substratum (198 species) in shallow waters (0-10 m) (319 species). Some species such as *Caulerpa racemosa*, *Amphistegina lobifera*, *Amphisorus hemprichii*, *Rhopilema nomadica*, *Mnemiopsis leidy*, *Hydroides* spp., *Ficopomatus enigmaticus*, *Charybdis longicollis*, *Rapana venosa*, *Asterias rubens*, *Siganus* spp. and *Lagocephalus sceleratus* show a highly invasive character, and have great impacts both on the prevailing ecosystems and humans.

Keywords: Alien species; Species list; Black Sea; Sea of Marmara; Aegean Sea; Levantine Sea; Turkey.

Introduction

There are probably no ecosystems on earth which may resist the introduction of an alien species. The worldwide vectors for alien marine species are diverse and can be listed under 15 broad categories, including prominent factors such as commercial shipping activities, canals, aquaculture and fisheries, drilling platforms and the aquarium industry (BAX *et al.*, 2003). Success of an introduced species in the new environment generally depends on a combination of several bio-ecological factors, but as experienced drastically in the Mediterranean Sea, some ecosystems are known to be more susceptible to invasion. In a recent review of the Mediterranean alien marine biota, the presence of 955 species is mentioned, where the eastern basin is still the favorite destination for aliens due to its proximity to the Suez Canal and dense maritime traffic (ZENETOS *et al.*, 2010b). The influx of a huge number of tropical species into the Mediterranean is doubtless the most remarkable bio-geographical phenomenon of today, but POR (2009) indicates in advance that what is happening now may be considered as a partial return to the original warm water biological conditions of the ancient Mediterranean Sea, possibly a normalization event from a geological perspective.

By means of quantitative occurrence of alien species, Turkey can be placed in the center of introductions (ZENETOS *et al.*, 2008). The most detailed analysis was hitherto conducted by ÇINAR *et al.* (2005a), who compiled a list of 277 alien species recorded from all seas surrounding Turkey, with the Suez Canal being the primary vector for species introductions. Due to lack of experts in definite systematic groups and the presence of a relatively low number of scientific research projects funded by the

government, the available alien biodiversity figure is probably an underestimate, likely to be solved only by specific studies concentrating on this key diversity change. Only a few measures are currently being taken by the government, including a prohibition of human mediated species introductions to wetlands (within the framework of the Ramsar Convention) which came into force in May 2005 (Ministry of Environment and Forestry), and a fisheries ban on the two alien pufferfishes, *Lagocephalus sceleratus* and *L. spadiceus*, which appeared in November 2008 in the Fisheries Bulletin of Ministry of Agriculture and Rural Affairs.

The present study focuses on an updated list of alien species occurring on the Turkish coastline that have been gathered from research papers and results of scientific projects, especially intensified during the last decade.

Methods

The present work includes the reports of alien species on the coasts of Turkey. In the paper by ÇINAR *et al.* (2005a), a species list was presented considering species reports up to 2005. Here, we give the list of alien species based on the species reports up to December 2010, together with the first years of their collections, unlike ÇINAR *et al.* (2005a) who only mentioned the first years of their reports. Reports of some alien species along the coasts of Turkey that have not yet appeared in journals now (in press status) were also considered in the present study (i.e. AKAMCA *et al.*, 2011; ÇINAR *et al.*, 2011). The occurrences of *Chama adspersa* in the Sea of Marmara and *Mya arenaria* in the Aegean Sea were validated after personal communications with Drs. C. DELONGUEVILLE and P. OVALIS, respectively. Some species previously considered as aliens were excluded

from the list of alien species in the Mediterranean Sea for a variety of reasons (i.e. misidentification, insufficient data for species). We did not include these species in the present list, unlike the paper by ÇINAR *et al.* (2005a). The present list also includes some species (i.e. *Sigambra parva*, *Podarkeopsis capensis*, *Aplysina parvula*) that were not previously considered as aliens or overlooked in the previous list presented in 2005.

Alien species were grouped into four main categories, namely established, casual, questionable and cryptogenic. The definition of the terms can be found in ZENETOS *et al.* (2010b). Briefly, established species are the alien species with self-maintaining populations; casual species are the species which were reported only once in the region; questionable species are the species which were reported without sufficient information and their taxonomic status is uncertain; cryptogenic species are the species with no definite evidence of their native or introduced status according to CARLTON (1996). Invasive species are the established aliens that have overcome biotic and abiotic barriers in the region and are able to expand their distributional ranges through the production of fertile offspring, with noticeable impact on the prevailing ecosystem.

Results and Discussion

List of species

The present study reports a total of 400 alien species belonging to 14 systematic groups up to the year 2010. The present paper also reports the first findings of *Vanderhorstia mertensi* in the Aegean Sea (Gökova Bay, 15 m) (M. BILECENOGLU pers. obs.), *Chama adspersa* in the Sea of Marmara (C. DELONGUEVILLE, pers. comm.) and *Mya arenaria* in the Aegean Sea (P. OVALIS, pers. comm.). In addition, the reports of 6 species

that have not been published yet (in press status in journals) have also been added to the alien species list of Turkey. These species belong to Foraminifera (*Coscinospira arietina*), Polychaeta (*Laonice norgensis*, *Prionospio (Minuspio) pulchra* and *Spiophanes algidus*) and Pisces (*Trypauchen vagina* and *Tylerius spinosissimus*) (for references see Table 1). Table 1 gives the list of all species reported from the coasts of Turkey together with their possible date of introduction, establishment successes, possible origin and means of introductions, and their habitat and depth preferences. The literature emphasizing the first report of the species in the seas that border Turkey is also given with in superscript code.

In the first review of alien species on the coasts of Turkey, ÇINAR *et al.* (2005a) presented a list of 277 alien species belonging to 13 systematic groups, based on the species records up to December 2005. In contrast to the previous list, the present review also includes the species belonging to the systematic groups Sipuncula and Chaetognatha. Among the groups, Mollusca possessed the highest number of species (105 species), followed by Polychaeta (75 species), Crustacea (64 species) and Pisces (58 species). A total of 5 groups (Sipuncula, Pantopoda, Bryozoa, Chaetognatha and Tunicata) were represented by 1-3 alien species.

In the 2005 review, a total of 7 phytoplankton species were regarded as alien species. Apart from these species, *Ceratium breve* (Ostenfeld et Schmidt) Schröder (EKER & KIDEYS, 2000), *Proboscia indica* (Peragallo) Hernández-Becerril (POLAT *et al.*, 2000), *Gonyaulax pacifica* Kofoid (POLAT, 2007), *Histioneis elongata* Kofoid et Michener (POLAT & KORAY, 2007) and *Heterodinium angulatum* Kofoid et Michener (POLAT & KORAY, 2007) were also considered as alien species, which were reported on the coasts of the Levantine Sea.

Table 1

The list of alien species and their first year of observations from the Turkish coasts. The habitat and depth preferences of aliens along the coasts together with their possible origins and establishment success are also given. BS: Black Sea, SM: Sea of Marmara, AS: Aegean Sea, LS: Levantine Sea, ES: Establishment Success (E: Established, C: Casual, Q: Questionable, Cr: Cryptogenic), O: Origin (IP: Indo-Pacific, RS: Red Sea, AT: Atlantic, WA: Western Atlantic, ST: Subtropical, IO: Indian Ocean, PG: Persian Gulf, PO: Pacific Ocean, TA: Tropical Atlantic, CT: Circumtropical, BA: Boreal Atlantic, Cas: Caspian Sea, Co: Cosmopolitan)

MI = Mode of Introduction (Su: Suez Canal, S: Shipping, G: Gibraltar, Aq: Aquaculture), H: Habitat [Hs: Hard Substratum (including algae, sponge), Ss: Soft Substratum (including phanerogames), P: pelagic, Pz: parasite], DR: Depth Range (I: 0–10 m, II: 11–50m, III: 51–100 m, IV: 101–200 m, V: 201–400, VI: 401–500 m). Ps= Present study, *ÇEVİK *et al.* (2011).

	BS	SM	AS	LS	ES	O	MI	H	D
PHYTOBENTHOS									
Cyanophyta (=Cyanobacteria)									
<i>Trichodesmium erythraeum</i> Ehrenberg, 1830	-	-	1990 ⁹²	-	E	RS/IP	Su	Hs/Ss	I
Rhodophyta									
<i>Acanthophora nayadiformis</i> (Delile) Papenfuss, 1968	-	1970 ²⁸⁸	1970 ¹⁶³	1989 ⁴³	Cr,Q	RS/O	Su	Hs	I,II
<i>Acanthophora muscoides</i> (Linnaeus) Bory de Saint-Vincent, 1753	-	-	1977 ²⁸⁹	-	Q	AT	S	Hs	I,II
<i>Asparagopsis armata</i> Harvey, 1855	1973 ²⁸⁷	1984 ²⁸⁹	1973 ²⁸⁷	1969 ²⁸⁵	E	AT/PO	S	Hs	I
<i>Asparagopsis taxiformis</i> (Delile) Trevisan de Saint-Léon, 1845	-	1984 ⁴⁶	2001 ⁵³	-	E	CT	Su	Hs	I
<i>Bonnemaisonia hamifera</i> Hariot, 1891	-	1984 ²⁸⁹	1998 ⁵³	1989 ⁴³	E	IP	?S	Hs	I
<i>Botryocladia madagascariensis</i> G. Feldmann, 1945	-	-	-	1995 ²⁶⁶	E	AT/PO	S	Hs	I
<i>Chondria curvilineata</i> F.S. Collins & Hervey, 1917	-	1984 ²⁸⁹	-	-	E	AT	S	Hs	II
<i>Colaconema codicola</i> (Børgesen) H.Stegenga, J.J.Bolton, & R.J.Anderson, 1997	1994 ⁵⁴	1984 ²⁸⁹	1990 ⁹²	1988 ⁴²	E	AT/PO	S	Hs/Ss	I
<i>Ganonema farinosum</i> (Lamouroux) Fan & Wang, 1974	1992 ⁴⁴	1899 ¹⁴⁸	1972 ⁵²	1989 ⁴²	Cr	RS/IP	Su	Hs/Ss	I
<i>Gracilaria arcuata</i> Zanardini 1858	-	1984 ²⁸⁹	-	-	Q	RS/IP	Su	Hs	I

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
<i>Griffithsia corallinoides</i> (Linnaeus) Trevisan, 1845	-	1986 ⁴⁶	-	-	E	AT/IP	G	Hs	I
<i>Hypnea spinella</i> (C. Agardh) Kützing, 1847	-	-	1983 ⁴¹	1989 ⁴²	E	CT	S	Hs	I
<i>Lophocladia lallemandii</i> (Montagne) Schmitz, 1893	-	-	1970 ⁶³	1986 ⁸⁸	E	IP	Su	Hs	I,II
<i>Polysiphonia fucooides</i> (Hudson) Greville, 1824	1973 ²⁸⁷	-	1973 ²⁸⁷	-	E	AT/IO	S	Hs	I,II
<i>Polysiphonia morrowii</i> Harvey, 1857	-	2007 ¹³²	-	-	E	PO	S	Hs	I
<i>Polysiphonia paniculata</i> Montagne, 1842	1972 ⁵²	-	2001 ²²⁴	1998 ²²³	E	AT/PO	S	Hs	I
<i>Polysiphonia kampsaxii</i> Boergesen, 1939	-	-	1977 ⁴⁰	1989 ⁴³	Q	IP	S	Hs	I
<i>Rhodophysema georgii</i> Batters, 1900	-	1984 ²⁸⁹	-	-	C	AT/PO	?S	Hs	I
Heterokontophyta=Ochrophyta									
<i>Cladosiphon zosterae</i> (J.Agardh) Kylin, 1940	-	1984 ⁴⁶	1983 ¹⁶⁵	1989 ⁴³	Cr	AT	S	Hs	I
<i>Chorda filum</i> (Linnaeus) Stackhouse 1797	-	1984 ²⁸⁹	-	-	C	AT/PO	?S	Hs	I,II
<i>Colpomenia peregrina</i> Sauvageau, 1927	-	1998 ⁵¹	-	-	E	IP	S	Hs	I
<i>Ectocarpus siliculosus</i> var. <i>hiemalis</i>	1973 ²⁸⁶	1972 ⁴⁷	1899 ⁴⁸	1986 ²⁴¹	Cr	AT	S	Hs	I
(Crouan frat.ex Kjellman) T.Gallardo 1992									
<i>Halothrix lumbricalis</i> (Kützing) Reinke, 1888	1998 ⁵⁵	1984 ⁴⁶	1980 ²⁸⁹	1993 ²⁴⁰	E	AT/PO	S	Hs	I
<i>Microspogonium globosum</i> Reinke 1888	-	2003 ²⁵⁶	-	-	Q	AT	S	Hs	I
<i>Pylaeiella littoralis</i> (Linnaeus) Kjellman, 1872	1984 ⁴⁸	1984 ⁴⁶	1983 ¹⁶⁶	1983 ¹⁶⁶	Cr	AT/PO	S	Hs	I
<i>Punctaria tenuissima</i> (C.Agardh) Greville, 1830	1993 ⁵⁴	-	-	-	E	AT	S	Hs	I
<i>Sargassum latifolium</i> (Turner) C.Agardh, 1820	-	1984 ²⁸⁹	1984 ²⁸⁹	-	Q	RS	?Su	Hs	I,II
<i>Sphaerotrachia firma</i> (Gepp) A.D.Zinova, 1940	-	1984 ²⁸⁹	1970 ⁶³	1984 ²⁸⁹	E	AT/PO	S	Hs	I
<i>Syropodium schimperi</i> (Buchinger ex Kützing) Verlaque & Boudouresque, 1991	-	-	1989 ²⁷³	1991 ⁴³	E	IP	?Su	Hs	I
Chlorophyta									
<i>Caulerpa mexicana</i> Sonder ex Kützing, 1849	-	-	-	2007 ¹³³	E	RS/IP	S	Ss	I

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
<i>Caulerpa racemosa</i> (Forsskål) J. Agardh var. <i>cylindracea</i> Verlaque, Huisman & Boudouresque, 1873	-	-	1993 ¹⁴¹	1995 ⁸⁹	E	CT	Su	Hs/Ss	I,II
<i>Caulerpa racemosa</i> var. <i>lamourouxii</i> f. <i>requienii</i> (Montagne) Weber-van Bosse, 1898	-	-	1998 ⁹¹	1980 ⁹⁰	E	IP	Su	Hs/Ss	I,II
<i>Caulerpa scapelliformis</i> (R. Brown ex Turner) C. Agardh, 1817	-	-	-	1995 ¹³⁸	E	IP	Su	Ss	I,II
<i>Caulerpa taxifolia</i> (M. Vahl) C. Agardh, 1817	-	-	-	2006 ⁹⁶	E	PO	S	Hs/Ss	I,II
<i>Codium fragile</i> subsp. <i>fragile</i> (Suringar) Hariot, 1889	1998 ⁴⁹	1998 ²²⁴	1983 ²⁸⁹	1998 ²²³	E	AT/PO	S	Hs	-
<i>Ulva fasciata</i> Delile, 1813	1988 ⁵⁰	1984 ⁵²	1975 ¹⁶⁴	1989 ⁴⁵	Cr	Co	Su/S	Hs	-
Phanerogame									
<i>Halophila stipulacea</i> (Forsskål) Ascherson, 1867	-	-	1956 ²⁹⁰	1967 ¹⁶⁶	E	RS/IO	Su	Hs/Ss	II
FORAMINIFERA									
<i>Agglutinella arenata</i> (Saïd, 1949)	-	2002 ¹⁷¹	-	-	C	PO	?S	?	III
<i>Amphisonus hemprichii</i> Ehrenberg, 1839	-	-	2004 ²⁰³	2002 ²⁰³	E	CT	Su	Hs/Ss	I,II
<i>Amphistegina lessonii</i> d'Orbigny, 1826	-	-	2007 ²⁰⁶	-	E	CT	Su	?	II
<i>Amphistegina lobifera</i> Larsen, 1976	-	2004 ²¹⁰	2001 ²⁰¹	1997 ³⁶	E	CT	Su	Hs/Ss	I,II
<i>Articulina alticostata</i> Cushman, 1944	-	-	2004 ²⁰²	-	C	IP	?S	?	II
<i>Astacolus insolitus</i> (Schwager, 1866)	-	-	2004 ²⁰²	-	C	PO	?S	?	III
<i>Astacolus sublegumen</i> (Parr, 1950)	-	-	2004 ²⁰²	-	C	PO	?S	?	II
<i>Brizalina simpsoni</i> (Heron-Allen & Earland, 1915)	-	-	2007 ²⁰⁶	-	C	RS	Su	?	II
<i>Clavulina angularis</i> d'Orbigny, 1826	-	-	-	2001 ³⁸	E	TA/RS	Su	?	II
<i>Clavulina</i> cf. <i>multicamerata</i> Chapman, 1907	-	-	-	2002 ²⁰³	E	RS/PO	Su	?	II
<i>Coscinospira arietina</i> (Batsch, 1791)	-	-	2008 ²⁰⁷	2002 ²⁰³	E	RS/TA	Su	?	II
<i>Coscinospira acicularis</i> (Batsch, 1791)	-	-	2007 ²⁰⁴	-	E	IP	Su	?	I

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
<i>Cushmanina striatopunctata</i> (Parker & Jones, 1865)	-	2007 ²¹¹	2008 ²⁰⁵	-	E	TA	?S	?	I
<i>Cyclorbiculina compressa</i> (d'Orbigny)	-	-	-	2002 ²⁰³	E	TA/PO	?S	?	II
<i>Cymbaloporella plana</i> (Cushman, 1924)	-	-	2007 ²⁰⁶	2002 ²⁰³	E	IP	Su	?	II
<i>Edentostomina cultrata</i> (Brady, 1881)	-	-	2004 ²⁰²	2002 ²⁰³	E	PO	?S	?	II
<i>Elphidium cf. charlottense</i> (Vella, 1957)	-	-	-	2002 ²⁰³	E	PO	?S	?	II
<i>Elphidium striatopunctatum</i> (Fichtel & Moll, 1798)	-	-	-	1997 ³⁶	E	RS	Su	?	II
<i>Euthymonacha polita</i> (Chapman, 1900)	-	-	2007 ²⁰⁶	-	C	PO	S	?	II
<i>Hauerina diversa</i> Cushman, 1946	-	-	2007 ²⁰⁶	1997 ³⁶	E	RS/AT	Su	?	II
<i>Heterocyclus tuberculata</i> (Möbius, 1880)	-	-	-	1988 ³⁸	E	RS	Su	?	?
<i>Heterostegina depressa</i> d'Orbigny, 1826	-	-	-	1988 ³⁸	E	CT	Su	Hs/Ss	II
<i>Miliolinella cf. hybrida</i> (Terquem, 1878)	-	-	-	2002 ²⁰³	E	RS/PO	Su	?	II
<i>Nodopthalmidium antillarum</i> (Cushman, 1922)	-	-	2002 ²⁰⁵	1995 ²⁰³	E	RS/TA	Su	?	II
<i>Planogypsina acervalis</i> (Brady, 1884)	-	-	2002 ²⁰²	2002 ²⁰³	E	RS/TA	Su	?	II
<i>Planogypsina squamiformis</i> (Chapman, 1901)	-	-	2001 ²⁰³	-	E	RS/TA	Su	?	II
<i>Pseudomassilina reticulata</i> (Heron-All. & Earland, 1915)	-	-	-	1988 ³⁸	E	RS/IP	Su	?	?
<i>Pulleniatina obliquiculata</i> (Parker & Jones, 1865)	-	-	2004 ²⁰⁹	-	C	IP	?	P	?
<i>Pyramidulina catesbyi</i> (d'Orbigny, 1839)	-	-	2008 ²⁰⁷	1988 ³⁸	E	CT	Su	?	II
<i>Pyrgo denticulata</i> (Brady, 1884)	-	-	-	2002 ²⁰³	C	RS/PO	Su	?	II
<i>Quinqueloculina cf. mosharafai</i> Saïd, 1949	-	-	-	2002 ²⁰⁵	C	RS	Su	?	II
<i>Schlumbergerina abveoliniformis</i> (Brady, 1879)	-	-	-	2002 ²⁰⁵	E	CT	Su	?	II
<i>Sorites orbiculus</i> Ehrenberg, 1839	2010 ²⁰⁸	-	2001 ²⁰¹	1988 ³⁸	E	CT	Su	Hs/Ss	I-III
<i>Sorites variabilis</i> Lacroix, 1941	-	-	2007 ²⁰⁶	2002 ²⁰⁵	E	RS	Su	Hs/Ss	II
<i>Spiroloculina angulata</i> (Cushman, 1917)	-	-	-	1988 ³⁸	E	IP	Su	?	I-II
<i>Spiroloculina antillarum</i> d'Orbigny, 1839	-	2007 ²⁰⁵	2004 ²⁰³	1988 ³⁸	E	CT	Su	?	I-II

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
<i>Triloculina</i> cf. <i>fichetiana</i> d'Orbigny, 1839	-	-	2008 ²⁰⁷	2004 ²⁰³	E	RS/TA	Su	?	II
CNIDARIA									
<i>Cortylophora caspia</i> (Pallas, 1771)	-	-	2004 ¹¹³	-	E	Co	S	Hs	I
<i>Macrorhynchia philippina</i> Kirchenpauer, 1872	-	-	-	2005 ¹¹⁰	E	CT	Su	Hs	I
<i>Cassiopea andromeda</i> (Forsskål, 1775)	-	-	-	2000 ⁶⁷	E	RS/IP	Su	P	I
<i>Rhopilema normadica</i> Gall, Spanier & Ferguson, 1990	-	-	-	1995 ¹⁷⁸	E	RS/IP	Su	P	I
<i>Phyllorhiza punctata</i> von Lendenfeld, 1884	-	-	-	2010 [*]	C	RS	Su	P	I
<i>Ocullina patagonica</i> De Angelis, 1908	-	-	-	2005 ¹¹⁰	E	WA	S	Hs	I
CTENOPHORA									
<i>Mnemiopsis leidyi</i> (Agassiz, 1865)	1993 ²¹⁷	1994 ¹⁷⁹	1994 ¹⁷⁹	1992 ²⁶⁸	E	WA	S	P	I, II
<i>Beroë ovata</i> Mayer 1912	1996 ¹⁸⁰	2004 ¹⁷⁰	-	-	E	WA	S	P	I, II
SIPUNCULA									
<i>Apionsoma</i> (<i>A.</i>) <i>misakianum</i> (Ikeda, 1904)	-	-	2000 ¹³	2008 ¹⁶	E	IP/WA	S	Ss	II-IV
<i>Aspidosiphon</i> (<i>A.</i>) <i>mexicanus</i> (Murina, 1967)	-	-	2000 ¹⁵	-	E	IO/WA	S	Ss	III-IV
<i>Aspidosiphon</i> (<i>A.</i>) <i>elegans</i> (Chamisso & Eysen., 1821)	-	-	2006 ¹⁴	2005 ¹⁴	E	RS/IP	Su	Hs	I
POLYCHAETA									
<i>Lepidonotus carinulatus</i> (Grube, 1870)	-	1959 ²⁴⁶	-	-	Q	RS/IP	S	Ss	?
<i>Lepidonotus tenuisetosus</i> (Gravier, 1902)	-	-	-	2005 ¹⁰²	E	RS/IP	Su	Hs	I
<i>Pistone guanche</i> San Martín, López & Núñez, 1999	-	-	-	2005 ¹⁰²	C	AT	S	Ss	I
<i>Eurythoe complanata</i> (Pallas, 1766)	-	-	-	1993 ¹³⁵	Q	?IP	Su	Hs	I
<i>Linopherus canariensis</i> Langerhans, 1881	-	-	2005 ¹⁰²	1993 ¹³⁵	E	At	S	Hs/Ss	I
<i>Podarkeopsis capensis</i> (Day, 1963)	-	-	1972 ¹³⁴	-	Q	IP	S	Ss	I
<i>Sigambra constricta</i> (Southern, 1921)	-	1959 ²⁴⁶	-	-	Q	RS/IP	S	Ss	?
<i>Sigambra parva</i> (Day, 1963)	-	-	1972 ¹³⁴	-	Q	IO	S	Ss	I

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
<i>Synelmis rigida</i> (Fauvel, 1919)	-	1959 ²⁴⁶	-	-	Q	RS/IP	S	Ss	?
<i>Eusyllis kupperi</i> Langerhans, 1879	-	-	-	2005 ¹⁰²	E	?AT	S	Hs	I
<i>Exogone breviannata</i> Hartmann-Schröder, 1959	-	-	-	2005 ¹⁰²	E	RS/IP	Su	Hs	I
<i>Prosphaerosyllis longipapillata</i> (Hart.-Schröder, 1979)	-	-	-	2005 ¹⁰²	E	PO	S	Ss	II
<i>Syllis pectinans</i> Haswell, 1920	-	-	2004 ¹¹³	-	E	PO	S	Hs	I
<i>Ceratonereis mirabilis</i> Kinberg, 1866	-	-	-	2005 ¹⁰²	E	RS/IP	Su	Hs/Ss	I-III
<i>Leonnates decipiens</i> Fauvel, 1929	-	-	-	2005 ¹⁰²	E	RS/IP	Su	Hs	I
<i>Leonnates indicus</i> Kinberg, 1866	-	-	-	2005 ¹⁰²	E	RS/IP	Su	Hs	I
<i>Leonnates persicus</i> Wesenberg-Lund, 1949	-	-	2001 ¹⁰⁸	2000 ¹³⁷	E	RS/IP	Su	Ss	II-IV
<i>Nereis jacksoni</i> Kinberg, 1866	-	-	-	2005 ¹⁰²	E	RS/IP	Su	Ss	I,II
<i>Nereis persica</i> Fauvel, 1911	-	1959 ²⁴⁶	-	2005 ¹⁰²	E	RS/IP	Su	Ss	I-III
<i>Pseudonereis anomala</i> Gravier, 1900	-	-	2004 ¹⁰⁵	1973 ⁶¹	E	RS/IP	Su	Hs	I
<i>Glycinde bonhourei</i> Gravier, 1904	-	-	-	2005 ¹⁰²	E	RS/IP	Su	Ss	I
<i>Lumbrineris perkinsi</i> Carrera-Parra, 2001	-	-	-	2005 ¹⁰²	E	IP	?Su	Hs	I,II
<i>Scoletoma debilis</i> Grube, 1878	-	1959 ²⁴⁶	-	-	Q	IP	S	Ss	?
<i>Eunice antennata</i> (Savigny, 1820)	-	-	-	1993 ¹⁹⁵	E	RS/IP	Su	Hs	I
<i>Lysidice collaris</i> Grube, 1870	-	-	1993 ¹⁰³	1993 ¹³⁵	E	RS/IP	Su	Hs/Ss	I,II
<i>Marphysa disjuncta</i> Hartman, 1961	-	-	-	2005 ¹⁹⁶	C	PO	S	Ss	III
<i>Palola valdida</i> (Gravier, 1900)	-	-	-	2005 ¹⁹⁵	E	RS	Su	Hs	I
<i>Onuphis eremita oculata</i> Hartman, 1951	-	-	-	2005 ¹⁰²	E	WA	S	Ss	I,II
<i>Dorvillea similis</i> (Crossland, 1924)	-	-	-	2005 ¹⁰²	E	RS/IP	Su	Hs/Ss	I,II
<i>Laonice norgensis</i> Sikorski, 2003	-	-	2000 ¹¹⁹	-	C	AT	S	Ss	IV
<i>Paraprionospio coora</i> Wilson, 1990	-	2008 ²⁸²	1999 ²⁸²	-	Cr	?IP	S	Ss	II-IV
<i>Polydora cornuta</i> Bosc, 1802	-	2002 ¹¹⁸	1986 ¹¹¹	-	E	WA	S	Ss	I,II

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
<i>Priosteopio (Aquilaspio) krusadensis</i> Fauvel 1929	-	-	-	2005 ¹¹⁶	E	IP	S	Ss	I
<i>Priosteopio (A.) sexoculata</i> Augener, 1918	-	-	-	2005 ¹¹⁶	E	RS/IP	S	Ss	I
<i>Priosteopio (Priosteopio) depauperata</i> Imajima, 1990	-	-	2000 ¹⁹	2005 ¹¹⁶	E	PO	S	Ss	I,II
<i>Priosteopio (P.) paucipinnulata</i> Blake & Kudenov, 1978	-	-	2000 ¹¹⁷	2009 ¹¹⁷	E	PO	S	Ss	I,II
<i>Priosteopio (P.) saccifera</i> Mackie & Hartley, 1990	-	-	2000 ¹¹⁹	1995 ¹⁰⁴	E	RS/IP	Su	Ss	I-III
<i>Priosteopio (Minuspio) pulchra</i> Imajima 1990	-	2008 ⁰⁷	2000 ¹¹⁹	-	E	IP	S	Ss	I-II
<i>Pseudopolydora paucibranchiata</i> Okuda, 1937	-	2008 ⁰⁷	2000 ¹¹⁵	2005 ¹¹⁵	E	IP	S	Hs/Ss	I
<i>Spitophanes algidus</i> Meißner, 2005	-	-	2000 ¹¹⁹	-	C	IO	S	Ss	IV
<i>Sreblospio gynobranchiata</i> Rice & Levin, 1998	-	2005 ¹¹²	2000 ¹¹¹	-	E	WA	S	Ss	I,II
<i>Capitellethus dispar</i> (Ehlers, 1907)	-	1959 ²⁴⁶	-	-	Q	RS/IP	S	Ss	?
<i>Dasybranchus carneus</i> Grube, 1870	-	1959 ²⁴⁶	-	-	Q	RS	S	Ss	?
<i>Neopseudocapitella brasiliensis</i> Rullier & Amoureaux, 1979	-	-	2001 ⁰⁹	-	E	RS/WA	S	Ss	II
<i>Notomastus aberans</i> Day, 1957	-	-	1980 ²³⁸	2000 ²¹⁶	E	IP	Su	Ss	I-III
<i>Notomastus mossambicus</i> (Thomassin, 1970)	-	-	-	2005 ¹⁰²	E	IO	Su	Ss	I-III
<i>Chaetozone corona</i> Berkeley & Berkeley, 1941	-	2010 ⁰⁷	1980 ¹⁰⁶	2005 ¹⁰²	Cr	?PO	S	Ss	I,II
<i>Timarete anchylochaeta</i> (Schmarda, 1861)	-	1959 ²⁴⁶	-	-	Q	IP	S	Ss	?
<i>Timarete caribous</i> (Grube, 1859)	-	-	-	2005 ¹⁰²	C	WA	S	Hs	I
<i>Timarete dasylophius</i> (Marenzeller, 1879)	-	1959 ²⁴⁶	-	-	Q	IP	S	Ss	?
<i>Timarete punctata</i> (Grube, 1859)	-	-	-	2005 ¹⁰¹	E	RS/IP	Su	Hs	I
<i>Pherusa parvata</i> (Grube, 1878)	-	-	-	2005 ¹⁰²	E	IP	S	Hs	I
<i>Pherusa saldanha</i> Day, 1961	-	-	-	2005 ¹⁰²	E	IO	S	Hs	I
<i>Metasychis gotoi</i> (Izuka, 1902)	-	2008 ¹⁰⁷	1996 ¹³⁶	2000 ¹⁰²	E	RS/IP	Su	Ss	II,III
<i>Loimia medusa</i> (Savigny, 1818)	-	1959 ²⁴⁶	-	-	Q	RS	?Su	Ss	?

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
<i>Pista unibranchia</i> Day, 1963	-	-	1998 ²⁰⁹	1993 ¹³⁵	E	RS/IP	Su	Ss	I,II
<i>Pobycirus twisti</i> Potts, 1928	-	-	-	2005 ¹⁰²	E	RS	Su	Hs/Ss	I
<i>Sreblosoma comatus</i> (Grube, 1856)	-	-	-	2005 ¹⁰²	E	IP	?Su	Hs	I
<i>Branchionma bairdi</i> (McIntosh, 1885)	-	-	-	2005 ¹⁰²	E	WA/PO	?S	Hs/Ss	I
<i>Branchionma luctuosum</i> Grube, 1869	-	-	-	2005 ¹¹⁰	E	RS/IP	Su	Hs	I
<i>Desdemona omata</i> Banse, 1957	-	2005 ¹¹²	-	-	E	IP	S	Ss	I
<i>Laonome triangularis</i> Hutchings & Murray, 1984	-	-	-	2005 ¹⁰²	E	PO	S	Ss	I
<i>Ficopomatus enigmaticus</i> (Fauvel, 1923)	-	1952 ¹²³	1972 ¹³⁴	-	E	ST	S	Hs	I
<i>Hydroides brachyacanthus</i> Rioja, 1941	-	-	-	2005 ¹⁰⁰	E	IP	?S	Hs	I
<i>Hydroides dianthus</i> (Verrill, 1873)	-	-	1865 ²⁴⁵	-	E	WA	S	Hs	I
<i>Hydroides diramphus</i> Mörech, 1863	-	1894 ²²⁷	-	2005 ¹⁰⁰	E	CT	S	Hs	I
<i>Hydroides elegans</i> (Haswell, 1883)	-	-	1972 ¹³⁴	1991 ⁶²	E	CT	S	Hs	I
<i>Hydroides heterocerus</i> (Grube, 1868)	-	-	-	2005 ¹⁰⁰	E	RS/IO	Su	Hs	I,II
<i>Hydroides homoceros</i> Pixell, 1913	-	-	-	2005 ¹⁰⁰	E	RS/IO	Su	Hs	I
<i>Hydroides minax</i> (Grube, 1878)	-	-	-	2005 ¹⁰⁰	E	IP	Su	Hs	I
<i>Hydroides operculatus</i> (Treadwell, 1929)	-	-	-	2005 ¹⁰⁰	E	IO	S	Hs	I
<i>Spirobranchus kraussi</i> (Baird, 1865)	-	-	-	2005 ¹⁰⁰	E	IP	Su	Hs	I
<i>Spirobranchus tetracerus</i> (Schmarda, 1861)	-	-	-	2005 ¹⁰⁰	E	IP	Su	Hs	I,II
<i>Janua</i> (<i>Dextospira</i>) <i>steueri</i> (Sterzinger, 1909)	-	-	-	2005 ¹⁰²	E	RS/IP	Su	Ss	I,II
<i>Sporobis marioni</i> Caullery & Mesnil, 1897	-	-	1987 ¹⁸³	2005 ¹⁰²	E	PO	S	Hs	I
PANTOPODA									
<i>Anoplodactylus californicus</i> Hall, 1912	-	-	-	1959 ²⁵¹	E	CT	Su	Hs	I

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
CRUSTACEA									
Copepoda									
<i>Centropages furcatus</i> (Dana, 1846)	-	2000 ²⁷⁰	-	1999 ²⁵⁹	E	RS/IP	Su	P	I-III
<i>Calanopia elliptica</i> (Dana, 1846)	-	-	-	1999 ²⁵⁹	E	RS/IP	Su	P	I
<i>Calanopia biloba</i> Bowman, 1957	-	-	-	2002 ²⁶⁹	E	RS/IP	Su	P	I-III
<i>Calanopia minor</i> Scott, 1902	-	-	-	1998 ²⁶⁹	C	RS/IP	Su	P	I-III
<i>Labidocera pavo</i> Giesbrecht, 1889	-	-	-	1999 ²⁵⁹	E	RS/IP	Su	P	I
<i>Subeucalanus suberassus</i> (Giesbrecht, 1888)	-	-	-	1998 ²⁶⁹	Q	IP	Su	P	I-III
<i>Parvocalanus latus</i> Andronov, 1972	-	1998 ²⁷⁰	-	1998 ²⁶⁹	E	IO	Su	P	I-III
<i>Parvocalanus elegans</i> Andronov, 1972	-	2000 ²⁷⁰	-	1998 ²⁶⁹	E	RS/IP	Su	P	I-III
<i>Acartia tonsa</i> Dana, 1848	-	1993 ¹⁶⁷	2001 ²⁵⁷	-	E	WA, IP	S	P	I
<i>Paracartia grani</i> Sars G.O., 1904	-	-	1998 ³⁰⁰	-	E	AT	S	P	I
<i>Spinocalanus temanovae</i> Damkar, 1975	-	-	-	1987 ²⁶⁹	Q	?	S	P	?
Cirripedia									
<i>Amphibalanus eburneus</i> (Gould, 1841)	1968 ²⁴⁴	1939 ²¹⁸	1968 ²⁴⁴	1968 ²⁴⁴	E	AT	S	Hs	I
<i>Balanus trigonus</i> Darwin, 1854	-	-	1993 ¹⁹⁰	-	E	CT	S	Hs	I
<i>Heterosaccus dollfusi</i> Boschma, 1960	-	-	-	1994 ²⁴²	E	RS	Su	Pz	I-II
Amphipoda									
<i>Elasmopus pectenicrus</i> (Bate, 1862)	-	-	-	2005 ²⁵⁰	C	CT	Su	Hs	I
<i>Gammaropsis togoensis</i> (Schellenberg, 1925)	-	-	-	2005 ²⁵⁹	E	Co	Su	Hs	I
<i>Haminera hamigera</i> (Haswell, 1879)	-	-	1976 ¹⁸⁶	1976 ¹⁸⁶	E	IP	Su	Hs	I
<i>Monocorophium sextonae</i> (Crawford, 1937)	-	2006 ³⁷	-	-	C	PO	S	Hs/Ss	II
<i>Parhyale explorator</i> Arresti, 1989	-	-	-	2005 ²⁵⁸	C	AT	S	Hs	I
<i>Stenothoe gallensis</i> Walker, 1904	-	-	1977 ¹⁸⁶	1976 ¹⁸⁶	E	IP	Su	Hs/Ss	I-II

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
Isopoda									
<i>Paradella diana</i> Menzies, 1962	-	-	2004 ¹¹³	-	E	Co	?S	Hs/Ss	I
<i>Sphaeroma walkeri</i> (Stebbing, 1905)	-	-	1995 ¹⁸²	-	E	IP	Su	Hs	I
Cumacea									
<i>Eucoma sarsii</i> (Kossmann, 1880)	-	-	1976 ¹⁷⁴	-	E	IP	Su	Hs/Ss	I,II
Decapoda									
<i>Fenneropenaeus merguensis</i> (De Man, 1888)	-	-	-	2006 ²³⁴	C	IP/PG	Aq	Ss	II
<i>Farfantepenaeus aztecus</i> (Ives, 1891)	-	-	-	2009 ¹²⁵	C	WA	S	Ss	II
<i>Marsupenaeus japonicus</i> (Bate, 1888)	-	2001 ²⁸³	2001 ²⁸³	1930 ²¹⁵	E	IP	Su	Ss	I-III
<i>Melicerus halhor</i> (Burkenroad, 1959)	-	-	2005 ²³⁰	2002 ¹⁹⁴	E	IP	Su	Ss	I-II
<i>Metapenaeopsis aegyptia</i> Galil & Golani, 1990	-	-	-	2003 ²⁷⁶	E	IP	Su	Ss	I
<i>Metapenaeopsis mogensis consobrina</i> (Nobili, 1904)	-	-	-	2003 ²⁷⁶	E	IP	Su	Ss	I
<i>Metapenaeus affinis</i> (H. Milne Edwards, 1837)	-	-	2008 ³⁹	-	E	IP	Su	Ss	I-II
<i>Metapenaeus monoceros</i> (Fabricius, 1798)	-	-	-	1959 ¹⁶⁸	E	IP	Su	Ss	I-II
<i>Metapenaeus stebbingi</i> (Nobili, 1904)	-	-	-	1966 ¹⁸⁵	E	RS/IO	Su	Ss	I-III
<i>Penaeus semisulcatus</i> de Haan, 1844	-	-	-	1930 ¹⁶¹	E	IP	Su	Ss	I-IV
<i>Trachysalambria palaestinensis</i> Steinitz, 1932	-	-	-	1968 ¹⁵³	E	IO	Su	Ss	I-V
<i>Leptocheila pugnax</i> de Man, 1916	-	-	2000 ³³	1966 ¹⁸⁵	E	IP	Su	Ss	I-IV
<i>Palaemonella rotumana</i> (Borradaile, 1898)	-	-	-	1999 ³⁵	E	IP	Su	Hs	I-II
<i>Urocaridella pulchella</i> Yokes & Galil, 2006	-	-	-	2003 ²⁷⁹	E	IP	Su	?	II
<i>Alpheus audouini</i> Coutière, 1905	-	-	-	2002 ¹⁴⁹	E	IP	Su	Hs	I-II
<i>Alpheus inopinatus</i> Holthuis & Gottlieb, 1958	-	-	-	1969 ¹⁵¹	E	IP	Su	Hs/Ss	I-II
<i>Alpheus migrans</i> Lewinsohn & Holthuis, 1978	-	-	-	1993 ¹⁸⁷	E	RS	Su	Ss	I-III
<i>Alpheus rapacida</i> de Man, 1908	-	-	2005 ²³⁰	1981 ¹⁸⁵	E	IP	Su	Ss	I-III

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
<i>Ogyrides njoiebergi</i> (Balss, 1921)	-	-	-	2005 ²³²	E	IP	Su	Ss	I
<i>Processa macrodactyla</i> Holthuis, 1952	-	-	1995 ³⁴	-	E	TA	G	Ss	II
<i>Calappa hepatica</i> (Linnaeus, 1758)	-	-	-	1992 ⁶⁰	C	IP	Su	Ss	I-III
<i>Ixa monodi</i> Holthuis & Gottlieb, 1956	-	-	2005 ⁸⁶	1955 ¹⁶⁹	E	RS	Su	Ss	I-II
<i>Coleusia signata</i> (Paulson, 1875)	-	2006 ³²	-	1976 ¹⁵⁹	E	RS	Su	Hs/Ss	I-II
<i>Euycarcinus integrifrons</i> De Man, 1879	-	-	-	2009 ²³³	C	IO	S	Ss	II
<i>Myra subgranulata</i> Kossmann, 1877	-	-	-	1930 ²¹⁵	E	RS/IO	Su	Ss	I-IV
<i>Micippa thalia</i> (Herbst, 1803)	-	-	2006 ²⁸¹	1994 ¹²⁹	E	IP	Su	Ss	I-IV
<i>Callinectes sapidus</i> Rathbun, 1896	-	2001 ²⁸³	1967 ¹⁸⁴	1959 ¹⁶⁸	E	WA	S	Ss	I-II
<i>Charybdis hellerii</i> (H. Milne Edwards, 1867)	-	-	2005 ²³⁰	1987 ¹²⁸	E	IP	Su	Hs/Ss	I-II
<i>Charybdis longicollis</i> Leene, 1938	-	-	2002 ²⁸¹	1959 ¹⁶⁸	E	IP	Su	Ss	I-IV
<i>Portunus segrus</i> (Forskål, 1775)	-	-	2004 ²⁸¹	1928 ¹⁶⁰	E	IP	Su	Ss	I-IV
<i>Thalamita poissionii</i> (Audouin, 1826)	-	-	1981 ¹⁸⁵	1959 ¹⁶⁸	E	IP	Su	Ss	I-II
<i>Carupa tenuipes</i> Dana, 1851	-	-	2003 ²⁸¹	1996 ²⁷⁶	E	IP	Su	Hs	I-II
<i>Pilumnopus vauquelini</i> (Audouin, 1826)	-	-	-	1966 ¹⁸⁵	E	RS/PG	Su	Hs	I
<i>Pilumnus minutus</i> De Haan, 1835	-	-	2000 ¹⁸⁸	2003 ¹⁸⁸	C	IP	Su	Hs	I
<i>Atergatis roseus</i> (Rüppell, 1830)	-	-	2004 ²⁸¹	1987 ¹²⁸	E	IP	Su	Hs	I-II
<i>Daira perlata</i> (Herbst, 1790)	-	-	-	1988 ¹²⁹	C	IP	Su	Hs/Ss	I-II
<i>Eucreate crenata</i> de Haan, 1835	-	-	-	1987 ¹²⁸	E	IP	Su	Ss	I-IV
<i>Percnon gibbesi</i> (H. Milne Edwards, 1853)	-	-	-	2005 ²⁷⁸	E	AT/TA	S	Hs	I-II
<i>Macrophtalmus graeffei</i> Milne Edwards, 1873	-	-	2000 ³³	1994 ¹²⁹	E	IP	Su	Ss	I-IV
Stomatopoda									
<i>Clorida albolitura</i> Ahyong & Naiyanetr, 2000	-	-	-	2009 ¹⁵⁰	E	IP	Su	Ss	II
<i>Eragosquilla massavensis</i> (Kossmann, 1880)	-	2002 ¹⁷⁵	2007 ²³¹	1959 ¹⁶⁸	E	IP	Su	Ss	I-IV

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
MOLLUSCA									
Gastropoda									
<i>Diodora ruppellii</i> (Sowerby, G.B.I., 1834)	-	-	-	1988 ¹³⁰	E	RS/IP	Su	Hs	I
<i>Nerita sanguinolenta</i> Menke, 1829	-	-	-	2004 ¹⁴²	E	RS	Su	Ss	I
<i>Smaragdia souverbiana</i> (Montrouzier, 1863)	-	-	-	1989 ⁸³	E	RS/IP	Su	Ss	I
<i>Trochus erythreus</i> Brocchi, 1821	-	-	-	1992 ¹²⁶	E	RS	Su	Hs	I
<i>Pseudomolinia nelyma</i> (Melville, 1897)	-	-	-	1992 ¹²⁶	E	RS/IO	Su	Ss	I,II
<i>Parviturbo dibellai</i> Buzzurro & Greppi, 2006	-	-	-	2006 ⁸²	Cr	?	?S	Ss	I
<i>Stomatella impertusa</i> (Burrow, 1815)	-	-	-	1999 ²⁴⁹	C	RS/IP	Su	Hs	I
<i>Cerithium scabridum</i> Philippi, 1848	-	-	1990 ⁹	1986 ¹⁹⁷	E	RS/IO	Su	Hs/Ss	I
<i>Cerithidium diplax</i> (Watson, 1886)	-	-	-	1986 ⁴	E	PG	S	Ss	I-II
<i>Cerithidium perparvulum</i> (Watson, 1886)	-	-	-	1995 ⁴	E	PO	S	Ss	I
<i>Rhinoclavis kochi</i> (Philippi, 1848)	-	-	-	1986 ¹⁹⁷	E	RS/IP	Su	Ss	I
<i>Diala varia</i> A. Adams, 1861	-	-	-	2002 ¹²¹	E	RS/IP	Su	Ss	I
<i>Gibborissoa virgata</i> (Philippi, 1849)	-	-	-	1997 ³	E	IP	Su	?	?
<i>Alvania dorbignyi</i> (Audouin, 1826)	-	-	-	1996 ⁸⁴	Cr	Co	?	Ss	I,II
<i>Finella pupoides</i> A. Adams, 1860	-	-	2001 ²³⁷	1958 ⁴	E	IP	Su	Ss	I
<i>Cerithiopsis pulvis</i> (Issel, 1869)	-	-	2003 ²³⁵	1990 ²⁶²	E	RS	Su	Ss	I
<i>Cerithiopsis tenthrenois</i> (Melville, 1896)	-	-	-	1990 ²⁶²	E	IO	Su	Ss	I
<i>Metaxia bacillum</i> (Issel, 1869)	-	-	-	1992 ¹²⁶	E	RS	Su	?	?
<i>Rissoina ambigua</i> (Gould, 1849)	-	-	-	2003 ²¹³	C	IP	?	Ss	II
<i>Rissoina bertholletii</i> Issel, 1869	-	-	-	1985 ¹³⁰	E	RS/IO	Su	Ss	I
<i>Conomurex persicus</i> (Swainson, 1821)	-	-	1991 ²²⁰	1978 ²¹⁹	E	PG	?S	Hs/Ss	I,II
<i>Purpuradusta gracilis notata</i> (Gill, 1858)	-	-	-	1982 ⁷⁸	E	RS/IO	Su	Hs	I

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
<i>Cycloscala hyalina</i> (Sowerby, 1844)	-	-	-	1995 ¹⁵⁴	E	RS/IP	Su	Ss	I
<i>Sticteulima</i> cf. <i>lentiginosa</i> (A. Adams, 1861)	-	-	-	1989 ²⁶¹	C	IP	?Su	?	?
<i>Ergalatax junionae</i> Houart, 2008	-	-	2002 ¹⁷²	1992 ¹²⁶	E	RS	S	Hs	I
<i>Thais lacera</i> (Bom, 1778)	-	-	-	1991 ²²⁰	E	PG/O	S	Hs/Ss	I
<i>Rapana venosa</i> (Valenciennes, 1846)	1960 ¹⁴⁶	1993 ²⁶	1995 ¹²⁶	-	E	PO	S	Ss	I
<i>Zafra savignyi</i> (Moazzo, 1939)	-	-	-	1986 ²	E	RS	Su	Ss	I, II
<i>Zafra selaphora</i> (Melvill & Standen, 1901)	-	-	-	1993 ²⁴³	E	RS/O	Su	Ss	I
<i>Lienardia mighelsi</i> Iredale & Tomlin, 1917	-	-	2003 ²¹³	-	C	IP	?Su	?	III
<i>Murchisonella columna</i> (Hedley, 1907)	-	-	-	1993 ⁷⁹	E	IP	?Su	Hs	I
<i>Chysallida fischeri</i> (Hornung & Mermod, 1925)	-	-	-	1989 ²¹²	E	RS	?Su	Ss	I
<i>Chysallida maiae</i> (Hornung & Mermod, 1924)	-	-	-	1963 ¹	E	RS	Su	Hs/Ss	I
<i>Chysallida micronana</i> (Öztürk & Aartsen, 2006)	-	-	2000 ²³⁶	1997 ²³⁶	C	RS	?S	Ss	I, II
<i>Chysallida pirintheta</i> (Melvill, 1910)	-	-	-	1989 ²¹²	E	RS	Su	Ss	I, II
<i>Amathina tricarinata</i> (Linnaeus, 1767)	-	-	-	2000 ⁹⁹	E	RS	Su	Hs	I
<i>Leucotina</i> cf. <i>eva</i> Thiele, 1935	-	-	2000 ²³⁹	1995 ¹⁵⁴	C	IP	?Su	Ss	I, II
<i>Leucotina natalensis</i> Smith, 1910	-	-	-	1986 ⁸	E	RS/IP	?Su	Ss	I
<i>Monotigma fuba</i> (A. Adams, 1853)	-	-	2008 ⁵	-	C	IP	Su	Ss	II
<i>Monotigma lauta</i> (A. Adams, 1853)	-	-	-	1989 ²¹²	E	RS/IP	Su	Ss	I, II
<i>Cingulina isseli</i> (Tryon, 1886)	-	-	-	1986 ¹¹	E	RS	Su	Ss	I
<i>Turbonilla edgarii</i> (Melvill, 1896)	-	-	-	1989 ²¹²	E	IP	Su	Ss	?
<i>Symola cinctella</i> A. Adams, 1860	-	-	-	1994 ¹⁰	C	RS/IP	Su	Ss	I
<i>Symola fasciata</i> Jickeli, 1882	-	-	2001 ²³⁷	1963 ¹¹	E	IP	Su	Ss	I
<i>Symola lendix</i> (A. Adams, 1853)	-	-	-	1988 ²¹²	E	PG	?Su	Ss	I
<i>Olostomia lonioli</i> (Hornung & Mermod, 1924)	-	-	-	2007 ¹²¹	C	RS	?Su	Ss	I, II

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
<i>Iolaea neofelixoides</i> (Nomura, 1936)	-	-	-	1994 ¹⁰	C	PO	?S	Ss	I
<i>Hinemoa cylindrica</i> (de Folin, 1879)	-	-	-	1992 ⁸⁵	C	IP	?S	?	?
<i>Acteocina criihodes</i> Melvill & Standen, 1907	-	-	-	2003 ²¹³	C	IP	?S	Ss	II
<i>Acteocina mucronata</i> (Philippi, 1849)	-	-	-	1986 ¹²	E	RS	Su	Ss	?
<i>Cyllichnina girardi</i> (Audouin, 1826)	-	-	1996 ⁸⁴	1990 ¹²	E	IP	Su	Ss	II
<i>Pyronculus fourierii</i> (Audouin, 1826)	-	-	-	1989 ¹¹	E	RS/IP	Su	Ss	II,III
<i>Bulla arabica</i> Malaquias & Reid, 2008	-	-	-	2001 ²⁸⁰	E	IP	?Su	Ss	II
<i>Haminoea cyanomarginata</i> Heller & Thomson, 1983	-	-	2002 ²⁸⁰	2002 ²⁸⁰	E	RS	Su	Hs	II
<i>Alys angustatus</i> Smith, 1872	-	-	-	1986 ⁷	Cr	RS	Su	Ss	I
<i>Chelidonura fulvipunctata</i> Baba, 1938	-	-	-	1959 ²⁵³	E	IP	?Su	Ss	I,II
<i>Oxynoe viridis</i> (Pease, 1861)	-	-	-	2002 ²⁸⁰	E	IP	?Su	Ss	I
<i>Elysia grandifolia</i> Kelaart, 1858	-	-	-	2001 ²⁸⁰	E	IO	?Su	Hs	I
<i>Elysia tomentosa</i> Jensen, 1997	-	-	-	2001 ²⁸⁰	E	?IP	?Su	Hs	I,II
<i>Aphysia dactylomela</i> Rang, 1828	-	-	-	2005 ¹¹⁰	E	CT	?Su	Hs	I
<i>Aphysia parvula</i> Guilding in Mörch, 1863	-	1961 ²⁵³	2004 ²⁶⁷	1961 ²⁵³	Cr	CT	?	Hs	I
<i>Bursatella leachii</i> Blainville, 1817	-	-	1959 ²⁵³	1959 ²⁵³	E	CT	?Su	Hs	I
<i>Siphonota geographica</i> (Adams & Reeve, 1850)	-	-	-	1999 ⁸¹	E	IP	Su	Ss	I,II
<i>Plocamopherus ocellatus</i> Rüppell & Leuckart, 1830	-	-	-	1998 ²⁸⁰	E	RS	Su	Hs	I
<i>Hypselodoris infucata</i> Rueppell & Leuckart, 1828	-	-	-	1999 ⁹³	E	RS/IP	Su	Hs	I
<i>Chromodoris annulata</i> Eliot, 1904	-	-	-	2008 ¹⁵⁶	E	RS/IP	Su	Hs	I
<i>Chromodoris quadricolor</i> (Rüppell & Leuckart 1830)	-	-	-	2004 ²³⁷	C	RS/IO	?Su	Hs	II
<i>Melibe viridis</i> (Kelaart, 1858)	-	-	-	2000 ²⁸⁰	E	IP	?Su	Hs	I
<i>Flabellina rubrolineata</i> (O'Donoghue, 1929)	-	-	2003 ²⁸⁰	2001 ²⁸⁰	E	RS/IP	Su	Hs	I,II

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
<i>Siphonaria crenata</i> de Blainville 1827	-	-	-	1999 ²⁸	E	RS/PG	Su	Hs	I
Bivalvia									
<i>Anadara transversa</i> (Say, 1822)	-	-	1977 ¹²⁴	-	E	WA	S	Ss	I,II
<i>Anadara inflata</i> (Reeve, 1844)	-	-	-	1998 ⁹⁸	C	IO	S	Ss	?
<i>Anadara kagoshimensis</i> (Tokunaga, 1906)	2003 ²³	1993 ²⁵	1995 ¹²⁶	-	E	IP	S	Ss	I,II
<i>Anadara natalensis</i> (Krauss, 1848)	-	-	-	1985 ²²⁰	E	RS/IO	Su	Ss	I,II
<i>Brachidontes phanaonis</i> (Fischer, P., 1870)	-	-	1990 ⁹	1978 ¹⁸¹	E	RS/IO	Su	Hs	I
<i>Septifer bilocularis</i> (Linnaeus, 1758)	-	-	-	2006 ²⁷	C	RS	S	Hs	II
<i>Septifer forskali</i> Dunker, 1855	-	-	-	2001 ²⁸	E	RS	S	Hs	I
<i>Crassostrea gigas</i> (Thunberg, 1793)	-	2004 ³⁰	-	1998 ⁹⁴	E	PO	Aq	Hs	I
<i>Saccostrea cucullata</i> (Born, 1778)	-	-	-	1998 ⁹⁴	E	RS/IP	S	Hs	I,II
<i>Dendrostreia frons</i> (Linnaeus, 1758)	-	-	-	1998 ⁹⁷	E	IP	?S	Hs	I
<i>Pinctada radiata</i> (Leach, 1814)	-	-	1990 ³⁶²	1982 ¹⁸¹	E	RS/IP	Su	Hs	I
<i>Electroma vexillum</i> (Reeve, 1857)	-	-	-	2002 ⁹⁵	E	RS/IP	Su	Hs	I
<i>Maifundus regulus</i> (Forsskål, 1775)	-	-	-	1973 ¹⁴³	E	RS/IP	Su	Hs	I
<i>Spondylus cf. multisetosus</i> Reeve, 1856	-	-	-	1992 ⁹⁷	Q	IP	?Su	Hs	I,II
<i>Spondylus spinosus</i> Schreibers, 1793	-	-	-	1991 ⁹⁷	E	RS/IP	Su	Hs	I,II
<i>Cardites akabana</i> (Sturany, 1899)	-	-	-	2005 ⁹⁹	C	RS	Su	Ss	I
<i>Chama aspersa</i> Reeve, 1846	-	1990 ⁸	2006 ²¹⁴	1993 ¹²²	E	RS/IP	?S	Hs	I
<i>Chama pacifica</i> Broderip, 1834	-	-	-	2000 ⁹⁷	E	RS/IP	Su	Hs	I,II
<i>Fulvia fragilis</i> (Forsskål, 1775)	-	-	2001 ²³⁸	1986 ¹⁹⁷	E	RS/IO	Su	Ss	I
<i>Afrocardium richardii</i> (Audouin, 1826)	-	-	-	2000 ⁶	E	RS	Su	Ss	?
<i>Tellina valtonis</i> Hanley, 1844	-	-	-	1995 ¹⁵⁴	C	RS/IO	Su	Ss	I
<i>Teredo navalis</i> Linnaeus, 1758	2007 ²⁵⁴	1966 ²²¹	2007 ²⁵⁴	2007 ²⁵⁴	Cr	CT	S	Hs	I

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
<i>Psammotreta praerupta</i> (Salisbury, 1934)	-	-	-	1992 ¹²⁷	C	WA	S	Ss	IV
<i>Gafarium pectinatum</i> (Linnaeus, 1758)	-	-	-	1986 ¹⁹⁷	E	RS/IP	Su	Ss	I
<i>Petricola henprichi</i> Issel, 1869	-	-	-	1999 ⁹⁹	Q	RS	Su	Hs	I
<i>Clementia papyracea</i> (Gmelin, 1791)	-	-	-	1985 ¹³⁰	E	RS/IP	Su	Ss	III
<i>Paphia textile</i> (Gmelin, 1791)	-	-	-	1985 ¹³⁰	E	RS/IP	Su	Ss	I,II
<i>Ruditapes philippinarum</i> (Adams & Reeve, 1850)	-	2004 ²⁴	2000 ²⁹	-	E	PO	Aq	Ss	I
<i>Antigona lamellaris</i> Schumacher, 1817	-	-	-	1988 ¹²⁷	C	RS/IP	Su	Ss	I
<i>Mya arenaria</i> Linnaeus, 1758	-	1993 ²⁵	2008 ^{8s}	-	E	WA	S	Ss	II
<i>Sphenia rueppelli</i> A. Adams, 1850	-	-	-	1998 ²⁸⁴	E	IO	?Su	Hs	I
<i>Gastrochaena cymbium</i> Spengler, 1783	-	-	-	1990 ²²⁰	E	RS/IP	Su	Ss	I-III
<i>Latemula anatina</i> (Linnaeus, 1758)	-	-	-	1992 ¹²⁶	E	RS/IP	Su	Ss	I-III
Cephalopoda									
<i>Octopus aegina</i> Gray, 1849	-	-	-	1992 ²⁴⁸	E	IP	Su	Ss	III
<i>Sepioteuthis lessoniana</i> Lesson, 1830	-	-	-	2002 ²⁴⁷	E	IP	Su	P	I-III
BRYOZOA									
<i>Celleporaria brunnea</i> (Hincks, 1884)	-	-	2004 ¹⁸⁹	-	E	AT	S	Ss	I
<i>Rhynchozoon larreyi</i> (Audouin, 1826)	-	-	1962 ²⁷¹	-	E	RS/IP	Su	Ss	I
ECHINODERMATA									
<i>Amphiodia (Amphispina) obiecta</i> Mortensen, 1940	-	-	-	2005 ²⁵²	E	IP	S	Ss	I-III
<i>Asterias rubens</i> Linnaeus, 1758	2003 ¹⁷³	1990 ²²	-	-	E	AT	S	Hs	I,II
<i>Diadema setosum</i> (Leske, 1778)	-	-	-	2006 ²⁷⁷	C	RS/IP	Su	Hs	I
<i>Ophiactis macrolepidota</i> Marktanner-Turneretscher, 1887	-	-	-	2005 ²⁵²	C	AT/PO	Su	Ss	I
<i>Ophiactis savignyi</i> (Müller & Troschel, 1842)	-	-	1993 ¹⁰³	2005 ²⁵²	E	RS/IP	Su	Hs	I

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
<i>Synaptula reciprocans</i> (Forsskål, 1775)	-	-	2001 ²⁸³	2005 ¹¹⁰	E	RS/IP	Su	Hs	I,II
CHAETOGNATHA									
<i>Ferosagitta galerita</i> (Dallot, 1971)	-	-	-	2003 ²⁵⁸	E	IO	S	P	I,II
TUNICATA									
<i>Phallusia nigra</i> Savigny, 1816	-	-	-	2005 ¹¹⁰	E	WA	?S	Hs	I,II
<i>Pyura</i> (= <i>Herdmania</i>) <i>momus</i> (Savigny, 1816)	-	-	-	2001 ¹¹⁰	E	RS	Su	Hs	I,II
<i>Synplegma brakenhielmi</i> (Michaelsen, 1904)	-	-	-	2005 ¹¹⁰	E	RS/IO	Su	Hs	I,II
PISCES									
Elasmobranchii									
<i>Carcharhinus altimus</i> (Springer, 1950)	-	-	-	1994 ⁵⁶	C	TA	G	Ss	I-VI
<i>Himantura uarnak</i> (Forsskål, 1775)	-	-	-	1966 ⁶⁵	E	RS/IP	Su	Ss	I,II
Actinopterygii									
<i>Chirocentrus dorab</i> (Forsskål, 1775)	-	-	-	1999 ¹⁷	Q	RS/IP	Su	P	I-III
<i>Dussumieria elopsooides</i> Bleeker, 1849	-	-	-	1952 ⁶⁴	E	RS/IP	Su	P	I,II
<i>Etrumeus teres</i> (DeKay, 1848)	-	-	2002 ²²⁵	1994 ⁵⁷	E	RS/IP	Su	P	I,II
<i>Herklotsichthys punctatus</i> (Rüppell, 1837)	-	-	-	1984 ²⁷⁴	E	RS	Su	P	I,II
<i>Enchelycore anatina</i> (Lowe, 1839)	-	-	2002 ²²⁵	1998 ³¹	E	TA	G	Hs	I,II
<i>Pisodonophis semicinctus</i> (Richardson, 1848)	-	-	-	2009 ⁷⁴	C	TA	G	Ss	I
<i>Bregmaceros atlanticus</i> Goode & Bean, 1886	-	-	2005 ¹⁴⁴	2002 ²⁷⁵	E	CT	Su/S	Ss	I, II
<i>Saurita undosquamis</i> (Richardson, 1848)	-	-	1973 ⁶⁶	1951 ¹⁹²	E	RS/IP	Su	Ss	I-III
<i>Parexocoetus mento</i> (Valenciennes, 1846)	-	-	1966 ⁶⁵	1966 ⁶⁵	E	RS/IP	Su	P	I
<i>Hemiramphus far</i> (Forsskål, 1775)	-	-	1942 ²⁶⁰	1942 ¹⁹¹	E	RS/IP	Su	P	I
<i>Fistularia commersonii</i> (Rüppell, 1835)	-	-	2002 ⁷⁷	2001 ⁷⁵	E	IP/IO	Su	Hs/Ss	I,II
<i>Hippocampus fuscus</i> Rüppell 1838	-	-	-	2003 ¹⁵⁸	E	RS/IO	Su	Ss	I

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
<i>Syngnathus rostellatus</i> Nilsson, 1855	-	-	-	2003 ¹⁵⁸	Q	BA	G	Hs/Ss	I
<i>Atherinonotus forskalii</i> (Rüppell, 1838)	-	-	1966 ¹⁵²	1949 ¹⁹¹	E	RS/IP	Su	P	I
<i>Sargocentron rubrum</i> (Forsskål, 1775)	-	-	1949 ¹⁹¹	1949 ¹⁹¹	E	RS/IP	Su	Hs	I-III
<i>Pelates quadrilineatus</i> (Bloch, 1790)	-	-	-	1984 ¹⁹⁹	E	RS/IP	Su	Ss	I,II
<i>Pomadasyx stridens</i> (Forsskål, 1775)	-	-	-	2009 ⁷⁴	C	RS/O	Su	Ss	I
<i>Apogon pharaonis</i> Bellotti, 1874	-	-	2002 ²²⁵	1984 ¹⁹⁹	E	RS/IP	Su	Hs/Ss	I,II
<i>Apogon fasciatus</i> (White, 1790)	-	-	-	2009 ²⁶⁵	E	RS/IP	Su	Ss	I-II
<i>Apogon queketti</i> Gilchrist, 1903	-	-	2009 ¹⁴⁵	2004 ¹³⁹	E	RS/O	Su	Ss	I-III
<i>Apogon smithi</i> (Kotthaus, 1970)	-	-	-	2008 ¹⁵⁵	E	RS/IP	Su	Ss	I,II
<i>Sillago sihama</i> (Forsskål, 1775)	-	-	2004 ⁶⁹	1983 ¹⁶²	E	RS/IP	Su	Ss	I,II
<i>Monotaxis grandoculis</i> (Forsskål, 1775)	-	-	-	2007 ⁷⁰	C	RS/IP	Su	Ss	I,II
<i>Alepes djedaba</i> (Forsskål, 1775)	-	-	1966 ¹⁵²	1955 ²¹	E	RS/IP	Su	P	I-III
<i>Nemipterus randalli</i> Russell, 1986	-	-	-	2007 ⁷²	E	RS/O	Su	Ss	I-II
<i>Equulites klunzingeri</i> (Steindachner, 1898)	-	-	1966 ⁶⁵	1942 ¹³¹	E	RS	Su	Ss	I-III
<i>Decaptenus russelli</i> (Rüppell, 1830)	-	-	-	2009 ¹⁹	E	RS/IP	Su	P	I-II
<i>Trachurus indicus</i> Nekrasov, 1966	-	-	-	2004 ¹²⁰	C	IO	Su	P	I-III
<i>Parupeneus forskalli</i> (Fourmanoir & Guézé, 1976)	-	-	-	2000 ¹¹⁰	C	RS/IP	Su	Ss	I
<i>Upeneus moluccensis</i> (Bleeker, 1855)	-	-	1956 ¹⁹³	1942 ¹⁹¹	E	IP	Su	Ss	I-IV
<i>Upeneus pori</i> Ben-Tuvia & Golani, 1989	-	-	2000 ²²²	1942 ¹⁹¹	E	RS/IP	Su	Ss	I,II
<i>Penptheris vanicolensis</i> Cuvier, 1831	-	-	1994 ¹⁹⁸	1983 ¹⁶²	E	RS/IP	Su	Hs	I,II
<i>Heniochus intermedius</i> Steindachner, 1893	-	-	-	2002 ¹⁵⁷	C	RS/IP	Su	Hs/Ss	I
<i>Liza carinata</i> (Valenciennes, 1836)	-	-	-	1955 ¹⁹³	E	RS/O	Su	P	I
<i>Liza haematocheila</i> (Temminck & Schlegel, 1845)	1992 ²⁷²	1995 ¹⁷⁷	1995 ¹⁷⁷	-	E	PO	Aq	P	I
<i>Splyraena chrysotaenia</i> Klunzinger, 1884	-	-	1966 ¹⁵²	1955 ²¹	E	RS/IP	Su	P	I,II

(Continued)

Table 1 (Continued)

	BS	SM	AS	LS	ES	O	MI	H	D
<i>Sphyaena flavicauda</i> Rüppell, 1838	-	-	-	2001 ⁷⁵	E	RS/IP	Su	P	I,II
<i>Platax teira</i> (Forsskål, 1775)	-	-	-	2006 ⁷¹	C	RS/IP	Su	Hs	I
<i>Pteragogus pelycus</i> Randall, 1981	-	-	2002 ⁷⁷	1998 ²⁵⁵	E	RS/IP	Su	Hs/Ss	I,II
<i>Champsodon nudivittis</i> (Ogilby, 1895)	-	-	-	2008 ¹¹⁴	C	IP/IO	Su/S	Ss	I,II
<i>Petroscirtes ancylodon</i> Rüppell, 1838	-	-	2005 ²²⁶	1997 ²⁵⁵	E	RS/IP	Su	Hs/Ss	I
<i>Callionymus filamentosus</i> Valenciennes, 1837	-	-	-	1983 ¹⁶²	E	RS/IP	Su	Ss	I-III
<i>Oxyurichthys petersi</i> (Klunzinger, 1871)	-	-	1991 ⁶³	1991 ¹⁷⁶	E	RS	Su	Ss	I-III
<i>Trypauchen vagina</i> (Bloch & Schneider, 1801)	-	-	-	2010 ¹⁸	C	IP/IO	Su	Ss	II
<i>Vanderhorstia mertensi</i> Klausewitz, 1974	-	-	2010 ⁸	2008 ⁷⁶	E	RS/IP	Su	Ss	I-III
<i>Siganus luridus</i> (Rüppell, 1829)	-	-	1973 ⁶⁶	1973 ¹⁴⁷	E	RS/IP	Su	Hs	I,II
<i>Siganus rivulatus</i> Forsskål, 1775	-	-	1943 ²⁶⁰	1942 ¹⁹¹	E	RS/IP	Su	Hs	I,II
<i>Scomberomorus commersoni</i> Lacepède, 1800	-	-	1994 ⁸⁰	1981 ¹⁶²	E	RS/IP	Su	P	I,II
<i>Cymoglossus sinusarabici</i> (Chabanaud, 1913)	-	-	-	1955 ²¹	E	RS	Su	Hs	I,II
<i>Stephanolepis diaspros</i> Fraser-Brunner, 1940	-	-	1943 ²⁶⁰	1949 ¹⁹¹	E	RS/IP	Su	Hs/Ss	I,II
<i>Lagocephalus sceleratus</i> (Gmelin, 1789)	-	-	2003 ²⁰	2004 ⁷³	E	RS/IP	Su	Ss	I,II
<i>Lagocephalus spadiceus</i> (Richardson, 1844)	-	2007 ²⁶³	1966 ⁶⁵	1949 ¹⁹¹	E	RS/IP	Su	Ss	I,II
<i>Lagocephalus suezensis</i> Clark & Gohar, 1953	-	-	2001 ⁷⁵	1998 ³⁷	E	RS	Su	Ss	I,II
<i>Sphoeroides pachygaster</i> (Müller & Troschel, 1848)	-	-	1999 ¹⁴⁰	1999 ¹⁹⁸	E	TA	G	Hs/Ss	I-V
<i>Torquigener flavimaculosus</i> Hardy & Randall, 1983	-	-	-	2002 ⁶⁸	E	RS/IP	Su	Ss	I,II
<i>Tylerius spinosissimus</i> (Regan, 1908)	-	-	-	2010 ²⁶⁴	C	IP	Su	Ss	II,III

However, GÓMEZ (2006; 2008, pers comm.) did not accept the alien status of these species in the Mediterranean Sea. He postulated that these species had been known for many years under different names or were very rare in the region. Therefore, we did not put these species in Table 1.

The algae species, *Polysiphonia kampsaxii*, *Acanthophora muscoides* and *Sargassum latifolium*, which were excluded from the alien list of the Mediterranean by ZENETOS *et al.* (2010b), are given here as questionable. General morphological features of these species match with their original and subsequent descriptions, but more material is needed to clarify their real taxonomic positions. ZENETOS *et al.* (2010b) cited the report of *Caulerpa taxifolia* from Iskenderun Bay by ÇEVİK *et al.* (2007) as *Caulerpa distichophylla* Sonder. However, we prefer to keep the previous name until new evidence for its taxonomic position has been presented.

In the review by ZENETOS *et al.* (2010b), some foraminiferan species were cited as casual but we have changed their established success to established here, based on personal observations and communications. For example, MERİÇ *et al.* (2010a) reported a single specimen of *Euthymonacha polita* collected near a submarine spring in Kusadası, Turkey. However, this species was later observed in different locations in the Aegean Sea (Ilica, NW Karaburun Peninsula and Kusadası), again around submarine springs (E. MERİÇ, pers. comm.), indicating that it has become established in the area. Again, only two specimens of *Cushmanina striatopunctata* were reported from the Dardanelles (MERİÇ *et al.*, 2009) and the Aegean Sea (MERİÇ *et al.*, 2008b). However, another specimen was also collected in the North Aegean Sea (Ayvalık, YOKES, unpublished data), suggesting that

it may be a rare species with a wide range of distribution along the Turkish coastline.

Five unidentified alien foraminiferan species, namely *Entosigmomorphina* sp., *Euuvigerina* sp., *Haddonina* sp., *Quinqueloculina* sp.C and *Triloculina* sp.A, were reported along the Turkish coasts (MERİÇ *et al.*, 2008a; 2010a; 2010b). These species are not included in Table 1. *Haddonina* sp., *Quinqueloculina* sp.C and *Triloculina* sp.A were also reported from the Gulf of Aqaba (HOTTINGER *et al.*, 1993). *Haddonina* sp. was abundantly observed on the Turkish Mediterranean coast (MERİÇ *et al.*, 2008a), and the latter two on the Aegean coast (MERİÇ *et al.*, 2010a; 2010b). *Entosigmomorphina* sp. seems to have originated from the Pacific and was rarely observed on the SW coast of Turkey (MERİÇ *et al.*, 2008a). *Euuvigerina* sp. seems to be a cryptogenic species, which was only reported from the North Aegean Sea. The species *Acervulina inhaerens*, *Iridia diaphana*, *Cymbaloporetta squamosa*, *Pyramidulina per-versa* and *Triloculina affinis* were given as alien by ZENETOS *et al.* (2008). These species have seldom been recorded or poorly preserved in the sediment or known as fossils in the Mediterranean area, thus they were excluded from the alien list of the Mediterranean Sea by ZENETOS *et al.* (2010b).

A debate is still continuing on the validity of two foraminiferan species, *Coscinospira hemprichii* and *Peneroplis arietina*. HOTTINGER *et al.* (1993) considered *Peneroplis arietina* as a junior synonym of *Coscinospira hemprichii*. Their explanation was based on the aberrant morphologies observed in the populations of peneroplids found in extreme environments with high salinity. They have compared specimens from the Gulf of Aqaba with those from the Persian Gulf and decided to include peneropliform and spiroliniform specimens with similar ornamentation and proportions of

the early growth stages within the same species. However, they mentioned that the generic separation of *Coscinospira* and *Peneroplis* could be justified only in the framework of a revision of the history of peneroplids during Tertiary times. *Coscinospira hemprichii* is also distributed in the Atlantic and Mediterranean areas. However, in the eastern Mediterranean, the two distinct morphologies were found together in high abundances. The test morphologies were very prominent in terms of many characteristics. Hybrid morphologies have not been observed. Besides, the specimens which fit the description of *Peneroplis arietina* well were observed in the Levantine Basin, but not in the western Mediterranean. Thus, the two distinct morphologies cannot be related to environmental factors, but this suggests the presence of two distinct species in the eastern Mediterranean. In accordance with GROSS (2010), *Coscinospira arietina* is used as the valid name in the present study. It is also suggested that the native *Coscinospira hemprichii* is a distinct species.

Distribution of alien species in the seas.

The highest number of alien species (330 species) was encountered on the Levantine coast of Turkey, followed by the Aegean Sea (165 species), the Sea of Marmara (69 species) and the Black Sea (20 species) (Fig. 1). A total of 124 new alien species were reported on the coasts of Turkey within five years (2005-2010) (increment: ca. 44%). Increase in the number of species varies among the seas. For example, the number of alien species was stable in the Black Sea, increased from 48 to 69 in the Sea of Marmara (increment: ca. 44%), from 98 to 165 in the Aegean Sea (increment: ca. 69%) and from 216 to 330 in the Levantine Sea (increment: ca. 52%). The reasons for the high increase in the number of alien

species within five years are mainly based on the increase in scientific efforts to determine the presence of alien species on the coasts and the reports of some species here that were not previously considered as aliens in the 2005 paper.

The increase in the number of alien species after the previous list also varies among groups. For example, the number of alien species rise from 26 to 75 in Polychaeta (increment: 189%), from 5 to 37 in Foraminifera (increment: 660%), from 51 to 64 in Crustacea (increment: 25%), from 90 to 105 in Mollusca (increment: 17%) and from 45 to 58 in Fishes (increment: 29%).

Phytobenthos (algae and phanerogame) rank first in terms of the number of alien species in the Black Sea (11 species, 55% of total number of alien species reported in the area) and the Sea of Marmara (22 species, 32%), whereas the group Pisces (31 species, 19%) and Mollusca (98 species, 30%) have the highest number of species in the Aegean and Levantine Seas, respectively (Fig. 1).

Probable vectors of Introduction

The main vector for the species introductions to the Turkish coasts is the Suez Canal, followed by shipping and Gibraltar (Fig. 2). Almost 66% of the total number of alien species used the Suez Canal as a gateway for entering the area. However, the importance of this vector is more distinct in the Levantine Sea, where the introduction of the majority of species (74% of total species) has been attributed to the Suez Canal. The importance of the Suez Canal as a vector of species introductions gradually diminishes from the Levantine Sea to the Black Sea. A total of 4 species (*Fenneropenaeus merguensis*, *Crassostrea gigas*, *Ruditapes philippinarum* and *Liza haematocheila*) were introduced to the Mediterranean and Black Seas for aquaculture pur-

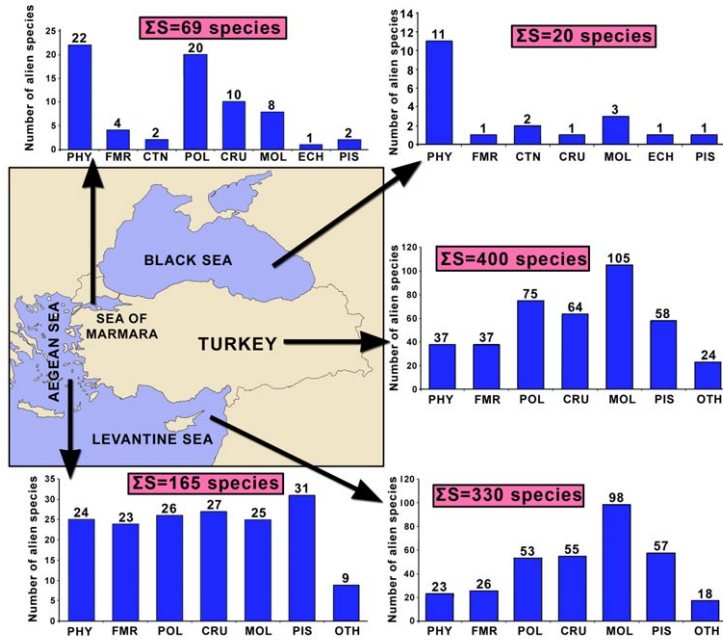


Fig. 1: The number of alien species along the coasts of Turkey. PHY: Phytobenthos, FMR: Foraminifera, CTN: Ctenophora, POL: Polychaeta, CRU: Crustacea, MOL: Mollusca, BRY: Bryozoa, ECH: Echinodermata, PIS: Pisces, OTH: Others. ΣS indicates the total number of species.

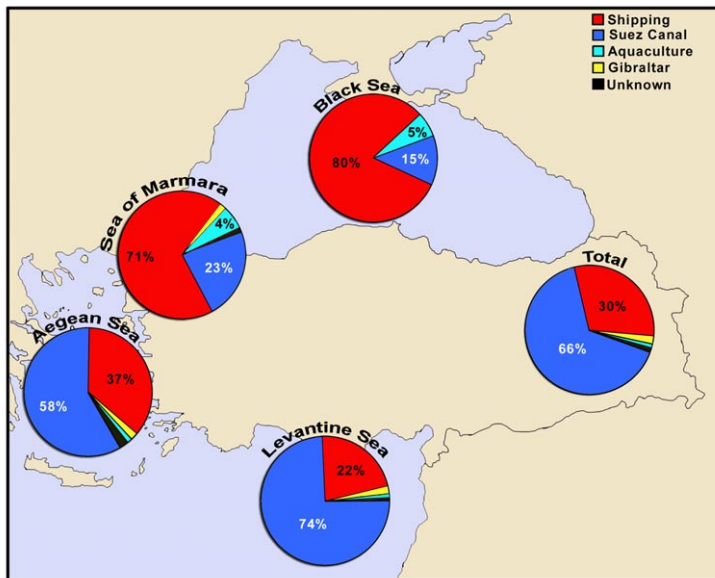


Fig. 2: The modes of introduction for alien species on the coasts of Turkey.

poses. The most successful species among them is *L. haematochelia*, which was first released into the Azov Sea from the Molochny Lagoon in 1985 and then largely expanded its distribution range to the Aegean Sea (Homa Lagoon) within 10 years (KAYA *et al.*, 1992). Ballast water and hull fouling are known to be main vectors for species translocations (CARLTON, 1985; GODWIN *et al.*, 2004). The number of introduced species has greatly increased worldwide since transoceanic shipping times became shorter than the larval life of most marine invertebrates (JENSEN & KNUDSEN, 2005). Huge volumes of ballast water (ca. 12 billion t annually) are discharged into or near ports (NETWIG, 2007), leading to establishment of some alien species that have remained alive in ballast tanks during voyage. GOLLASCH (2007) postulated that almost 33% and 27% of total marine alien species worldwide have been introduced from one area to another by hull fouling and ballast water, respectively. Almost 122 alien species have been introduced to the coasts of Turkey via shipping. This type of vector is more ap-

parent in the Sea of Marmara and the Black Sea. Ship-mediated alien species account for 71% and 80% of total alien species in the Sea of Marmara and the Black Sea, respectively. Some sessile species such as *Hydroides* spp., *Ficopomatus enigmaticus* and barnacles, which play important roles in biofouling, could have been transferred to the area by hull fouling. The invasive spionid polychaetes such as *Polydora cornuta*, *Streblospio gynobranchiata* and *Pseudopolydora paucibranchiata* were reported to have been introduced to Izmir Bay via ballast water from ships (ÇINAR *et al.*, 2005b).

The importance of type of vector for species introductions in each systematic group is depicted in Figure 3. Shipping is responsible for more than 50% of the species introductions in 6 systematic groups, whereas the Suez Canal is the main vector for species introductions in Foraminifera (71% of total foraminifer species), Crustacea (78%), Mollusca (74%), Echinodermata (67%), Tunicata (67%) and Pisces (86%). Two alien bryozoan species, *Celleporaria brunnea* and *Rhynchozoon larreyi* seem to

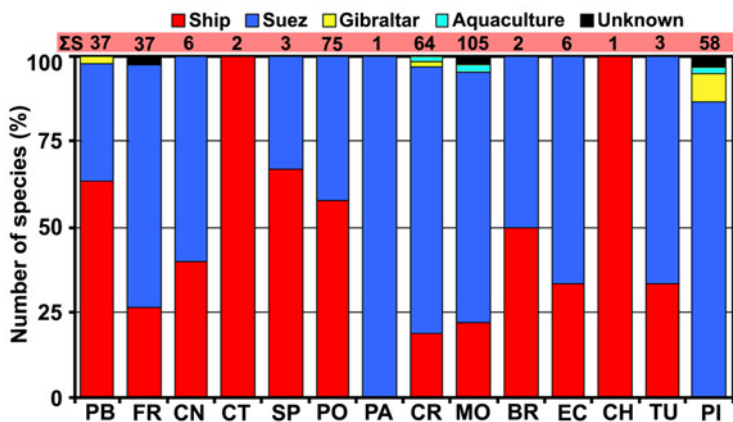


Fig. 3: The modes of introduction for alien species in each systematic group. PB: Phytobenthos, FR: Foraminifera, CN: Cnidaria, CT: Ctenophora, SP: Sipuncula, PO: Polychaeta, PA: Pantopoda, CR: Crustacea, MO: Mollusca, BR: Bryozoa, EC: Echinodermata, CH: Chaetognatha, TU: Tunicata, PI: Pisces.

have been introduced to the coasts of Turkey via ships and the Suez Canal, respectively (KOÇAK, 2007; ÜNSAL & d'HONDT, 1979). All ctenophore and chaetognath species were transferred to the area via ships. No fish species was recorded as having been introduced into Turkish waters via ships. However, only a single tropical Atlantic originated species, *Pinguipes brasilianus*, was mentioned in the CIESM atlas as having probably been introduced by ballast waters (GOLANI *et al.*, 2002). Other alien fish suspected to have arrived via shipping activities include *Omobranchus punctatus*, *Bregmaceros atlanticus*, *Champsodon nudivittis*, *Tridentiger trigonocephalus* and *Opleognathus fasciatus* (GOLANI, 2004; ÇIÇEK & BILECENOGLU, 2009; GOREN *et al.*, 2009; SCHEMBRI *et al.*, 2010), since they are encountered far distant from their source populations and have never been found in the Red Sea. However, a possible penetration of these species from the Suez Canal cannot be neglected by the authors, i.e. cases of *B. atlanticus* (GOREN & GALIL, 2006) and *C. nudivittis* (ÇIÇEK & BILECENOGLU, 2009) are good examples on the matter. Suspicion about the vector of origin of a definite species may only change with further studies and additional records from other localities. For example *Platax teira*, which was previously assumed to be an aquarium escape without excluding the possibility of Lessepsian migration by BILECENOGLU & KAYA (2006), has recently been found off Israeli shores, indicating the Suez Canal as a mode of entry (GOLANI *et al.*, 2011). Similarly, the recent occurrence of the spiny blaasop, *Tylerius spinosissimus*, at Iskenderun Bay could not be clearly linked to any vectors by TURAN & YAGLIOGLU (2011). However, after it was found off Israeli coasts, GOLANI *et al.* (2011) stated that we should

consider the species as a Lessepsian migrant, without neglecting the possible distribution of the species in Red Sea.

Establishment Success

Of the 400 alien species reported from the coasts of Turkey, 305 species (76% of total number of species) can be classified as established, 59 species as casual (15%), 23 species as questionable (6%) and 13 species as cryptogenic (3%) (Fig. 4). As only eggs and yolk-sac larvae of *Chirocentrus dorab* were reported from the Levantine coast of Turkey (AK-ÖREK & UYSAL, 2008), its establishment success was considered as questionable. The status of casual species could be turned into established ones if further evidence of their presence in other areas is provided. Of three groups (Thallophyta, Polychaeta and Mollusca) that have cryptogenic species, Thallophyta possess the highest number of species (6 species), followed by Mollusca (5 species) and Polychaeta (2 species). The percentages of established species in total number of alien species reported from the Turkish coasts vary from 63% (Sea of Marmara) to 83% (Aegean Sea). The highest percentage of cryptogenic species (25%) was encountered in the Black Sea. The Sea of Marmara was characterized by the highest percentage of questionable species (12 species, 17% of total number of species), the majority of which (9 species) belong to Polychaeta. These species were given by RULLIER (1963), but their presences in the area are still in debate, due to poor descriptions (no figures) of the species. All alien species belonging to the groups Ctenophora, Sipuncula, Pantapoda, Bryozoa, Chaetognatha and Tunicata seem to have become established on the coasts of Turkey (Fig. 5). Mollusca (79 species) and Polychaeta (56 species) have the highest number of established

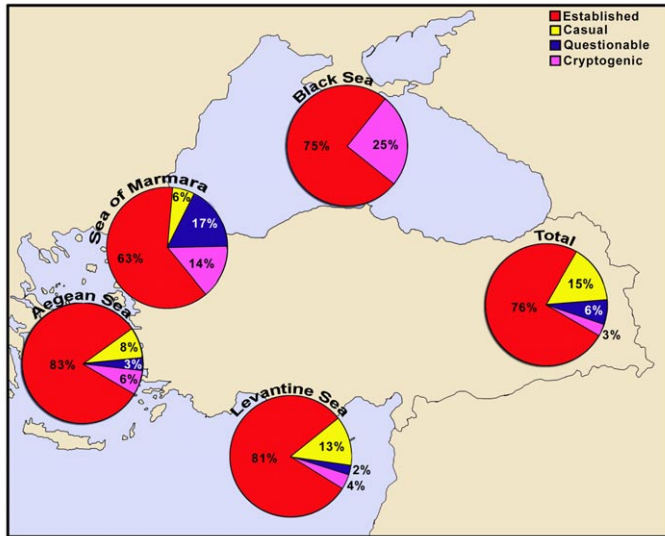


Fig. 4: The establishment successes of alien species reported on the coasts of Turkey.

species. The high number of casual species was reported within the groups Mollusca (19 species) and Pisces (11 species). Polychaeta (12 species) and Phytobenthos (5 species) have high numbers of questionable species.

Rate of Invasion

The new additions to the number of alien species on the coasts of Turkey greatly increased after 1990. A total of 154 alien species were known from the area before 1990 and 247 alien species were added to the list after 1990 (increment: 160%) (Fig. 6). A decreasing pattern is apparent in the yearly rate of introduction over the past years (Table 2). While one new alien species was introduced every 22 weeks from 1951 to 1970 on the coast of Turkey, the time span decreased to 4 weeks between 1991 and 2010. Increase in the invasion rate is most probably due to the acceleration in species introduction to the region, the range extensions of some species that were pre-

viously reported from the south-west of the Levantine Sea and the increase in the number of papers regarding alien species. The correlation analysis showed that a significant relationship ($R^2=0.98$, $p<0.05$) exists between the number of new records of alien species and the number of papers on them over the years. In the last 5 years (2005-2010), a total of 100 papers regarding alien species on the Turkish coasts have been published, reporting a total of 124 new alien species belonging to different groups, mostly Foraminifera and Polychaeta.

Depth and habitat preferences of alien species

The distributions of the total number of alien species by depth and habitat are depicted in Figure 7. The majority of aliens reported from the Turkish coasts were found on soft substrata (198 species) in shallow waters (319 species). A total of 34 species, mostly fishes, live in pelagic environment (Fig. 8). Some species such as *Dorvillea similis*, *Stenothoe gallensis*, *Charybdis hellerii*,

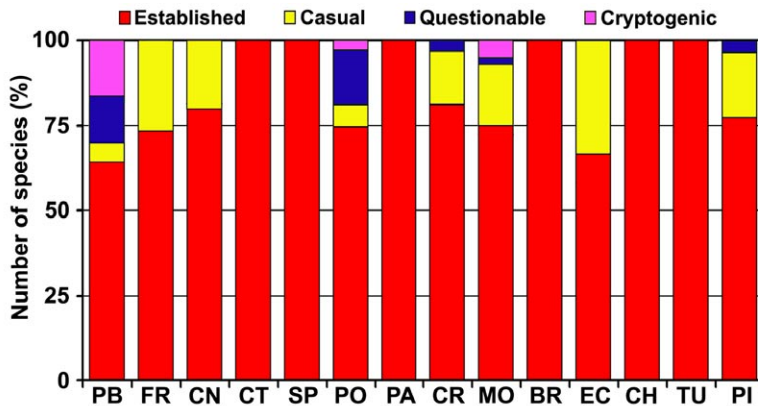


Fig. 5: The establishment successes of alien species in each systematic group. For abbreviations, see Figure 3.

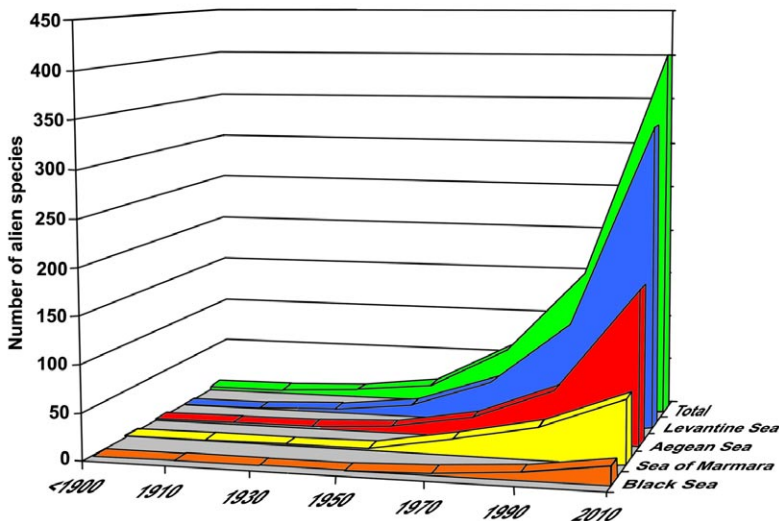


Fig. 6: Rate of introduction of alien species along the coasts of Turkey.

Thais lacera and *Chrysallida maiae* were reported both from the hard and soft substrata. The habitat types of many alien foraminifer species are unknown as species descriptions were based on their dead tests (i.e. MERIÇ *et al.*, 2004a; 2010a) that had accumulated in the benthic area. Only

Heterosaccus dollfusi, which was found on the Lessepsian crab *Charybdis longicollis* (ØKSNEBJERG *et al.*, 1997), was reported as a parasite. All alien species of Pantopoda, Bryozoa and Tunicata, and more than 50% of a number of species of Phyto-

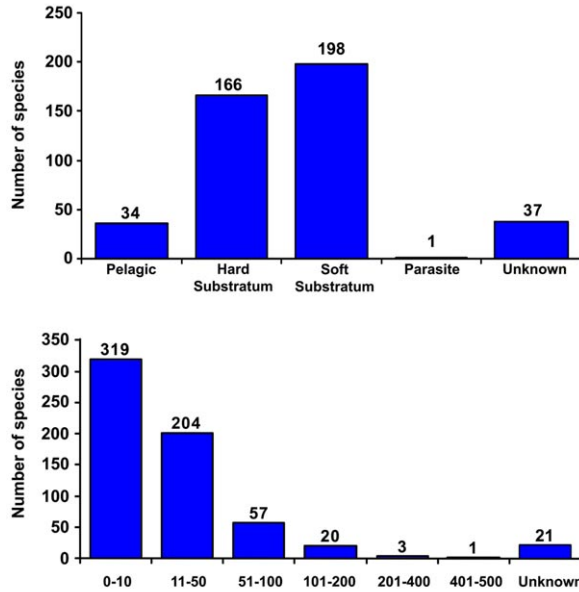


Fig. 7: The habitat (upper graphic) and depth (lower graphic) preferences of alien species along the coasts of Turkey.

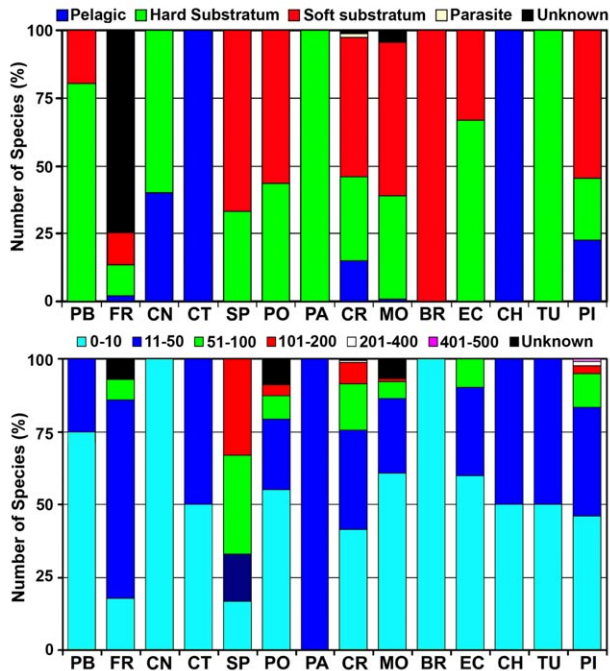


Fig. 8: The habitat (upper graphic) and depth (lower graphic) preferences of alien species in each systematic group. For abbreviations, see Figure 3.

Table 4
Time span (weeks) for alien species' introduction along the Turkish coasts.

	1951-1970	1971-1990	1991-2010
	Weeks per 1 alien species		
Black Sea	494	164.6	82.3
Sea of Marmara	70.6	54.9	29.1
Aegean Sea	65.9	29.1	8.8
Levantine Sea	34.1	14.3	4.5
Total	22	10.9	4

ed on hard substrata. The majority of species belonging to the groups Sipuncula, Polychaeta, Crustacea, Mollusca and Pisces were reported from soft substrata.

The number of alien species decreases with increasing depths. A sharp decrease occurs from 11 m downwards. Alien species greatly dominate the shallow water (0-10 m) habitats (319 species, 80% of total number of species). The alien species that were reported in deep waters are *Trachysalambria palaestinensis*, *Carcharhinus altimus* and *Spherooides pachygaster*. All species of Cnidaria and Bryozoa, and more than 50% of the species of Phytobenthos, Polychaeta, Mollusca, Echinodermata and Pisces were reported between 0 and 10 m depths. Alien sipunculans species were reported between 11 and 200 m depths.

Impacts of Alien species

It is generally accepted that alien species may have ecological, economic or health related influences, especially after they succeed in establishing dense populations, or presenting invasive characters. Although a wide range of scientific literature has tended towards the negative impacts of alien species-giving rise to the axiomatic 'native good, aliens bad' philosophy, facilitative alien-native interactions also occur frequently

as an indication of the positive alien impact (GOODENOUGH, 2010). The review by ÇINAR *et al.* (2005a) presented concise data on the impact of alien species on Turkey (for example *Caulerpa racemosa*, *Mnemiopsis leidyi*, *Beroe ovata*, *Rapana venosa* etc.), while some new and updated information is given below.

Alien species have become very important components of benthic and pelagic communities in Iskenderun Bay. A bottom trawl haul in August 2009 (30 m depth) near Yumurtalık revealed that 92% of the number of specimens and 89% of total biomass belonged to Lessepsian species (unpublished data). *Rhopilema nomadica* (58% of total biomass), *Charybdis longicollis* (17%), *Penaeus semisulcatus* (5%) and *Equulites klunzingeri* (4%) comprised the majority of biomass (84%) in the area. The most abundant species in the catch were *C. longicollis* (63% of total specimens) and *E. klunzingeri* (20%).

The genus *Caulerpa* was represented by two alien species on the coasts of Turkey, i.e. *C. racemosa* and *C. scalpelliformis* (ÇINAR *et al.*, 2005a), while CEVIK *et al.* (2007) later added *C. taxifolia* to the list based on the material collected off Yumurtalık coasts (Iskenderun Bay) during 2006. The DNA sequences revealed that

the Turkish population was different from that inhabiting the Western Mediterranean Sea. Shipping (most probably) or aquarium dumping was suspected as a possible vector of the introduction of the Turkish population. Its origin was thought to be the Australian coast. However, there is a debate on its taxonomic position. ZENETOS *et al.* (2010b) regarded the report of *C. taxifolia* from Iskenderun Bay as *C. distichophylla*. However, we use the previous name as evidence for *C. distichophylla* has not been presented till now. Although *C. taxifolia* seems to be established in Iskenderun Bay, there is not enough data at the moment to indicate any possible negative impacts on the biota. A recent observation (July 2009) by M.E. ÇINAR and M. BILECENOĞLU revealed that the population of *C. taxifolia* was very scarce in the area. However, a monitoring programme specific to this species is urgently needed.

Halophila stipulacea is a locally abundant species, forming meadows generally at depths below 25 m. A competition between native seagrasses and *H. stipulacea* has not been observed yet. This alien seagrass seems to support a diverse local biota including epiphytes and benthic invertebrates, which constitute food sources for organisms at higher trophic levels (AKCALI & CIRIK, 2007).

It has been suggested that the majority of the alien foraminifer species observed on the coasts of Turkey were introduced from the Red Sea. The most abundant species are *Amphistegina lobifera*, *Amphisorus hemprichii*, *Sorites orbiculus*, *Heterostegina depressa* and *Coscinospira arietina*. The alien foraminifer species are found to coexist with other native benthic foraminifers. However, *A. lobifera* and *A. hemprichii* were found to be exceptionally common on the southwestern coasts of Turkey. They fully cover

benthic habitats in shallow waters and even colonize biota such as the alien phanerogame *Halophila stipulacea* (Fig. 9). Holes among crusts formed by overlapped tests of *A. hemprichii* can also serve as hiding places for some species, such as small individuals of *Octopus vulgaris* (Fig. 9).

Amphistegina lobifera shows a wide distribution range in the Indo-Pacific and Atlantic Oceans (LANGER & HOTTINGER, 2000), and it is the most abundant alien foraminifer species in the Mediterranean Sea. It was recorded in Israel (LANGER & HOTTINGER, 2000), Lebanon (MONCHARMONT ZEI, 1968), Greece (KOUKOUSIOURA *et al.*, 2010), Turkey (AVŞAR, 1997), Libya (BLANC-VERNET *et al.*, 1979), Tunisia (GLACON, 1962) and Malta (YOKEŞ *et al.*, 2007a). According to LANGER & HOTTINGER (2000), the occurrences of living amphisteginids are delimited by the 14°C winter isotherms. However, *A. lobifera* is observed almost everywhere on the Aegean and Mediterranean coasts of Turkey, and even in the Sea of Marmara. Dense populations of *A. lobifera* observed around the submarine springs on the Aegean coast of Turkey suggest that the environmental conditions created by the warm springs help the thermophilic aliens to form dense local colonies and find the chance to spread the larval forms (MERİÇ *et al.*, 2010a).

Amphisorus hemprichii is also widely distributed in the Indo-Pacific and abundantly found in the Gulf of Aqaba, Red Sea (REISS & HOTTINGER, 1984; HAUNOLD *et al.*, 1998). Populations of *A. hemprichii* were first determined in June 2002 in sediment samples from a few coves around Kalkan, Kas, and Kekova (Antalya-SW Turkey). However, within two years, it had covered more than 100 km coastline and is still spreading towards the



Fig. 9: Dense settlements of *Amphisorus hemprichii* on leaves of *Halophila stipulacea* (upper figure) and on hard substrates, serving as a hiding place for a young individual of *Octopus vulgaris* (lower figure) (Photograph: Baki Yokeş).

Aegean Sea. Both *Amphistegina lobifera* and *A. hemprichii* form uncountable dense populations on the benthos along the coasts of Antalya (SW Turkey) (MERIÇ *et al.*, 2008a). The density of living *A. lobifera* individuals on rocks can reach 230000-310000 ind. m⁻². The high ratio of tests in the sediment (>350 ind./g; 0.75 g tests/g) results in large amounts of sand formation at an extreme rate. Certain stations off Kaş (Antalya) were monitored for six years and the deposition of the test belonging to these two species was found to be 2-4.5 cm/year. The extensive accumulation of sand is creating an immense ecological problem by changing the whole habitat type and coastal structure, while definitely altering the species composition of the

coastal ecosystem (YOKEŞ & MERIÇ, 2004).

Massive swarms of the stinging nomadic jellyfish *Rhopilema nomadica* have been considered a threat to human health, tourism and fisheries since their first occurrence on the Mersin coasts during August 1995 (KIDEYS & GÜCÜ, 1995). In summer 2009, several blooms were observed along the coastline between Antalya and Adana, where 815 hospitalized cases were recorded (ÖZTÜRK & ISINIBİLİR, 2010). Some injuries were quite serious, leaving whip-like marks on the body (Fig. 10). The other alien jellyfish, *Cassiopea andromeda*, not currently as widespread as *R. nomadica*, form only locally abundant populations.

A recent study in Ölüdeniz Lagoon (Fethiye) indicated that *C. andromeda* reached a maximum density of 14 individuals per 100 m², but no injury has been reported to date, despite its potential threat to human health (ÖZGÜR & ÖZTÜRK, 2008). Recently, a single specimen of the Lessepsian jellyfish, *Phyllorhiza punctata*, was captured in Iskenderun Bay (ÇEVİK *et al.*, 2011). If it forms a proliferating population in the area, it would become a pest for tourism activities and fisheries.

The other alien invertebrates that pose risks to human health are *Macrorhynchia philippina* (Hydrozoa), *Eurythoe complanata* (Polychaeta) and *Diadema setosum* (Echinoidea). The first two species, which have nematocysts and venomous chaetae, respectively, have built up dense populations on the Levantine coast of Turkey and may cause continuous itching and painful stinging when touched (ÇINAR *et al.*, 2006a, pers. obs.). The long spines of *D. setosum* with barbed tips can penetrate human skin

and release venom from their tissue and lumen. The venom may cause redness, swelling and acute pain, which subsides after a few hours; however, spine fragments are difficult to remove, and healing may take several weeks (YOKEŞ & GALİL, 2006a).

The sipunculan species, *Aspidosiphon* (*A.*) *elegans*, which is a bio-eroder species, has an impact on shapings of limestone in shallow waters, together with other boring species such as *Lithophaga lithophaga* (LINNAEUS, 1758) [AÇIK, 2008a, pers. obs. (MEÇ)]. The eunicid worms, *Eunice antennata* and *Palola valida*, also play important roles in the erosion of calcareous structures in the area. The former species is locally abundant (KURT SAHİN & ÇINAR, 2009a).

The ballast water-mediated polychaete species such as *Polydora cornuta*, *Streblospio gynobranchiata* and *Pseudopolydora paucibranchiata* dominate the polluted soft-bottom benthic environments in Izmir Bay (ÇINAR *et al.*, 2006b) and the Golden Horn



Fig. 10: A swimmer stung by *Rhopilema nomadica* at Yumurtalik (Adana) during fall 2009 (Photograph: Tahir Özcan).

Estuary (ÇINAR *et al.*, 2009) and seem to have replaced some other opportunistic polychaete species such as *Capitella* spp. and *Malacoceros fuliginosus* (CLAPARÈDE, 1869). These alien species account for almost 90% of total zoobenthic populations in Alsancak Harbour and its vicinity (ÇINAR *et al.*, 2006b; DAĞLI & ÇINAR, 2008).

The natural and artificial hard substrates in Iskenderun and Mersin Bays (south-east of Turkey) were densely colonized by alien serpulid polychaetes such as *Hydroides operculatus* and *Pomatoleios kraussii*, comprising 95% of the total serpulid specimens in the area. The Lessepsian species, *P. kraussii*, formed a densely populated belt in shallow-water areas in Mersin Bay, providing a suitable habitat for small vagile fauna (ÇINAR, 2006). In the area, the population density and biomass values of *H. operculatus* reached up to 384000 ind.m⁻² and 246 g.m⁻², respectively. *Hydroides elegans* and *H. dianthus* form dense populations in Alsancak Harbour (Izmir Bay) and their population densities may attain 110700 ind.m⁻² and 33050 ind.m⁻², respectively (ÇINAR *et al.*, 2008). *Hydroides elegans* is one of main pests for aquaculturists in the Aegean Sea [pers. obs. (MEÇ)]. This species together with other fouling organisms can block the net mesh and greatly reduce water circulation. The reef builder species, *Ficopomatus enigmaticus*, was considered an ecosystem engineer by providing a suitable habitat for other species and also by changing the physical factors of the invaded environment (SCHWINDT *et al.*, 2001). This species was reported from the Sea of Marmara (DEMİR, 1952-1954) and the Aegean Sea (ERGEN, 1976), and forms dense aggregates on artificial substrates like wood or concrete piles. These species, with their calcareous tubes, may become a nuisance to humans when they attach themselves to hard underwater

structures such as quays, mariculture equipment and ship hulls.

The invasive crab, *Percnon gibbesi*, was first recorded along the coast of Turkey in the Kaş-Kekova Marine Protected Area in 2006 (YOKEŞ & GALİL, 2006b). Only two individuals were found at two locations in 2006, whereas 112 individuals at 27 locations were observed in 2010 (KATSANEVAKIS *et al.*, 2011). This species is omnivorous, primarily feeding on algae. Its impact on the prevailing ecosystem is unpredictable at the moment but because of its invasive character, *P. gibbesi* is a pest species candidate.

The sea-star *Asterias rubens* has intensively invaded the shallow-water benthic habitats of the Sea of Marmara and expanded its distributional range to the Black Sea (ALBAYRAK, 1996; KARHAN *et al.*, 2007). This species consumes large quantities of the native mussel *Mytilus galloprovincialis* (LAMARCK, 1819) and competes with the large sea-star *Marthasterias glacialis* (LINNAEUS, 1758) for food and space (KARHAN *et al.*, 2007). The dimension of its impact on the prevailing ecosystem is still unknown and requires further investigation.

The newly discovered alien bristle star in the Mersin and Iskenderun Bays, *Amphiodia obtecta*, was reported to be of invasive character, reaching a maximum density of 420 ind.m⁻² in summer (STÖHR *et al.*, 2010). Bristle stars are known to feed on small invertebrates such as polychaetes and crustaceans (KISSELEVA, 1981). It was shown that the density and biomass of *A. obtecta* were negatively correlated with those of sipunculan and other echinoderm species (STÖHR *et al.*, 2010). However, the impact of *A. obtecta* on the prevailing ecosystem is still little understood and requires further investigation.

Lagocephalus sceleratus, which poses a great risk to human health due to tetrodotoxin in its flesh and is also a major nuisance to small-scale fisheries (BILECENOGLU, 2010), is probably the worst invasive alien fish species throughout the entire Levant basin. Cases of poisonings in Turkey have become quite frequent over the last few years. However, there has been no report of a death until now. The fishing, landing and marketing of *L. sceleratus* were totally banned by the Turkish government in November 2008, but human consumption of this highly toxic pufferfish still continues, especially in the vicinity of Antalya, increasing the potential lethal risks. The species have powerful jaws that easily cut bottom longlines, thus also resulting in a financial loss for small scale fisheries.

Siganus spp. present complicated impacts on the eastern Mediterranean ecosystem. Their grazing pressure on the intertidal rocky algae have likely resulted in the eradication of some local vegetation and enhanced settlement of the alien mussel, *Brachiodontes pharaonis* (GALIL, 2007). Although we also suspect a similar negative impact on the Turkish coasts, further research is required. The venomous spines of *Siganus* spp. have a potential risk to humans, but envenomations are generally rapidly recovered from due to the relatively weak toxin of the species. It is worth noting that siganids are frequently marketed (sometimes at a high price during the summer season) and commercially support local fisheries.

The red-eye round herring (*Etrumeus teres*), which expanded its range to the Aegean Sea, has regularly been caught off the Turkish Levant coast since the 1990's (BILECENOGLU, 2010) and a commercially fishable population was reported from the Rhodes area (CORSINI *et al.*, 2005).

Considering the southern Aegean coasts of Turkey, local purse seiners frequently capture the species in small quantities (100-200 kg/day), but a larger scale fishery was recently observed (ca. 20 tonnes within 2 days) on the Marmaris coast on 8th February 2011 and appeared in many Turkish newspapers, erroneously called '*Japon Hamsisi*' (Japanese anchovy). The fish was transported to Izmir to be sold at a price of ca. 2.5 euros/kg. Although the reasons for this unexpectedly dense population of *E. teres* cannot be easily explained at the moment, it seems to have the potential to support local fisheries. The species was recently observed in the Northern Aegean Sea (YARMAZ *et al.*, 2010) without any clues to indicate an established population. However, we should not discount a population increase in the area.

The recent invasion of shrimp-goby, *Vanderhorstia mertensi*, was documented from Turkey by BILECENOGLU *et al.* (2008). After its first occurrence in Fethiye Bay, *V. mertensi* has rapidly increased its population especially in soft substrates of shallow coasts and spread to southern Turkey (YOKES *et al.*, 2009). The species is known to live in symbiosis with *Alpheus* spp., but more specifically with the Lessepsian migrant *A. rapacida*. According to a recent study conducted in Gökova Bay, a small population of *V. mertensi* was observed at a depth of 15 m, which represents the first record of this species in the Aegean Sea. The existence of the shrimp-goby along the Turkish coasts currently seems to have no negative impact on the local fauna, while some indirect positive influences may be suspected. The biodiversity of the Kas-Kekova Specially Protected Area has long been monitored by one of us (MBY), where the alien alpheid *A. rapacida* appeared in remarkable quantities only after the shrimp-

goby introduction. Since alpheid crustaceans constitute a common prey item of several Mediterranean demersal fish species, we may suspect a facilitative impact of the increased alien alpheid population as a potential food resource. Another alien burrowing goby, *Trypauchen vagina*, has recently been reported from Iskenderun Bay (AKAMCA *et al.*, 2011) shortly after its first Mediterranean occurrence on the Israeli coast (SALAMEH *et al.*, 2010), but it is not clear at the moment if the species has the potential to impact on the food web structure in the future.

Conclusions

The present review elucidates that the coasts of Turkey, especially the Levantine coast, are under heavy invasion by alien species, mostly coming from the Red Sea and Indo-Pacific areas. Scientific and public interest in the species introductions and their impacts have resulted in the production of new papers and synthesis on them, and made great contributions to our understanding of the dimensions of this phenomenon. Therefore, this up-to-date inventory of the alien species on the coasts of Turkey, apart from its scientific merits, can fulfil the needs of the regulatory requirements and environmental management options for decision makers. Unfortunately, strict precautions and regulations to limit the spread of invasive species have not been implemented in Turkey. To date, no regulation concerning the control of ballast water discharge (except for polluted ballast waters) has been put into effect. However, some developments relating to this are said to be taking place in the near future.

Monitoring studies to be held along the coasts of Turkey are crucial to determine the new entry of alien species to the area.

Such studies might also provide extensive information about prompt action for their control and eradications. Therefore, bioecological studies in hot spot areas for alien species such as the Iskenderun and Mersin Bays, large international harbors, estuarine areas and deltas should be performed and monitored.

Acknowledgments

We are greatly indebted to Dr. Argyro ZENETOS (Greece) and three referees for their constructive comments on the ms. We would also like to thank Drs. Christiane DELONGUEVILLE (Belgium), Roland SCAILLET (Belgium) and Panayotis OVALIS (Greece) for providing us with collection dates for some molluscan species.

References

- ¹AARTSEN, J.J. Van, 1977. European Pyramidellidae: I. Chrysallida. *Conchiglia*, 13: 49-64.
- ²AARTSEN, J.J. Van, 1997. *Anachis* in the Mediterranean: a note on distribution. *La Conchiglia*, 282: 29.
- ³AARTSEN, J.J. Van, 2002. Indo-Pacific migrants into the Mediterranean. 1. *Gibborissoa virgata* (Philippi, 1849). *La Conchiglia*, 303: 56-58.
- ⁴AARTSEN, J.J. Van, 2006. Indo-Pacific migrants into the Mediterranean. 4. *Cerithidium diplax* (Watson, 1886) and *Cerithidium perparvulum* (Watson, 1886) (Gastropoda, Caenogastropoda). *Basteria*, 70: 33-39.
- ⁵AARTSEN, J.J. Van, 2009. Indo-Pacific migrants into the Mediterranean. 6. *Monotigma fulva* (A. Adams, 1853) (Gastropoda, Opisthobranchia, Pyramidellidae). *Basteria*, 73: 97-98.
- ⁶AARTSEN, J.J. Van & GOUD, J., 2000.

- European marine Mollusca: Notes on less well-known species. XV. Notes on Lusitanian species of *Parvicardium Monterosato*, 1884 and *Afrocardium richardi* (Audouin, 1826) (Bivalvia: Heterodonta: Cardiidae). *Basteria*, 64: 171-186.
- ⁷AARTSEN, J.J. Van & GOUD, J., 2006. Indo-Pacific migrants into the Mediterranean. 31. *Alys angustatus* Smith, 1872 (Gastropoda, Opisthobranchia). *Basteria*, 70: 29-31.
- ⁸AARTSEN, J.J. Van & HORI, S., 2006. Indo-Pacific migrants into the Mediterranean. 2. *Monotigma lauta* (A. Adams, 1853) and *Leucotina natalensis* Smith, 1910 (Gastropoda, Pyramidellidae). *Basteria*, 70: 1-6.
- ⁹AARTSEN, J.J. Van & KINZELBACH, R., 1990. Marine molluscs from the Iztuzu beach near Dalyan (Mediterranean coast of Turkey). *Zoology in the Middle East*, 4: 103-112.
- ¹⁰AARTSEN, J.J. Van & RECEVIK, M., 1998. Two more Indo-Pacific species found in the Mediterranean. *La Conchiglia*, 286: 13-15.
- ¹¹AARTSEN, J.J. Van, BARASH, A. & CARROZZA, F., 1989. Addition to the knowledge of the Mediterranean mollusca of Israel and Sinai. *Bollettino Malacologico*, 25 (1-4): 63-76.
- ¹²AARTSEN, J.J. Van, CARROZZA, F. & LINDNER, G., 1990. *Acteocina mucronata* (Philippi, 1849), a recent Red Sea immigrant species in the eastern Mediterranean. *Bollettino Malacologico*, 25 (9-12): 285-298.
- ¹³AÇIK, S., 2007. Observations on the population characteristics of *Apionsoma (Apionsoma) misakianum* (Sipuncula: Phascolosomatidae), a new species for the Mediterranean fauna. *Scientia Marina*, 71 (3): 571-577.
- ¹⁴AÇIK, S., 2008a. Occurrence of the alien species *Aspidosiphon (Aspidosiphon) elegans* (Sipuncula) on the Levantine and Aegean coasts of Turkey. *Turkish Journal of Zoology*, 32: 443-448.
- ¹⁵AÇIK, S., 2008b. Sipunculans along the Aegean coast of Turkey. *Zootaxa*, 1852: 21-36.
- ¹⁶AÇIK, S., 2010. Sipunculan fauna in the Fethiye-Göçek Specially Protected Area. *Mediterranean Marine Science*, 11 (1): 105-116.
- ¹⁷AK ÖREK, Y. & UYSAL, Z., 2008. The first Mediterranean record of eggs and yolk-sac larvae of Indo-Pacific *Chirocentrus dorab* (Forsskål, 1775) (Teleostei: Chirocentridae). In: *32nd Annual Larval Fish Conference*, August 4-7, 2008, Kiel, Germany. (abstract)
- ¹⁸AKAMCA, E., MAVRUK, S., ÖZYURT, C.E. & KIYAGA, V.B., 2011. First record of the Indo-Pacific burrowing goby *Trypauchen vagina* (Bloch and Schneider, 1801) in the North-Eastern Mediterranean Sea. *Aquatic Invasions*, 6 (Suppl. 1): 19-21.
- ¹⁹AKAMCA, E., MAVRUK, S., ÖZYURT, C.E., KIYAGA, V.B. & MANASIRLI, M., 2010. Two new Lessepsian species found in the north-eastern Levantine Basin: Broadbanded Cardinalfish (*Apogon fasciatus* (White, 1790)) and Indian Scad (*Decapterus russelli* (Rüppell, 1830)) (Osteichthyes). *Zoology in the Middle East*, 51: 116-118.
- AKCALI, B. & CIRIK, S., 2007. Alien and invasive seaweeds distribution along the Turkish coast of the Aegean Sea. *Rapport de la Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée*, 38: 412.
- ²⁰AKYOL, O., ÜNAL, V., CEYHAN, T.

- & BILECENOĞLU, M., 2005. First confirmed record of the silverside blaasop, *Lagocephalus sceleratus* (Gmelin, 1789), in the Mediterranean Sea. *Journal of Fish Biology*, 66: 1183-1186.
- ²¹AKYÜZ, E., 1957. Observations on the Iskenderun red mullet (*Mullus barbatus*) and its environment. *GFCM Proceedings and Technical Papers*, 4: 305-326.
- ²²ALBAYRAK, S., 1996. Echinoderm fauna of the Bosphorus (Türkiye). *Oebalia*, 22: 25-32
- ²³ALBAYRAK, S., 2003. On the Mollusca Fauna of the Black Sea near Istanbul. *Zoology in the Middle East*, 30: 69-75.
- ²⁴ALBAYRAK, S., 2005. First record of *Tapes philippinarum* (Adams & Reeve, 1850) (Bivalvia: Veneridae) from the Sea of Marmara. *Zoology in the Middle East*, 35: 108-109.
- ²⁵ALBAYRAK, S. & BALKIS, N., 1996a. Bivalve Fauna of the Bosphorus. *Istanbul Üniversitesi Fen Fakültesi Biyoloji Dergisi*, 59: 1-15.
- ²⁶ALBAYRAK, S. & BALKIS, N., 1996b. Benthic Prosobranch Gastropods of the Bosphorus. *Istanbul Üniversitesi Fen Fakültesi Biyoloji Dergisi*, 59: 17-26.
- ²⁷ALBAYRAK, S. & ÇAĞLAR, S., 2006. On the presence of *Siphonaria belcheri* Hanley, 1858 [Gastropoda: Siphonariidae] and *Septifer bilocularis* (Linnaeus, 1758) [Bivalvia: Mytilidae] in the Iskenderun Bay (SE Turkey). *Aquatic Invasions*, 1 (4): 292-294.
- ²⁸ALBAYRAK, S. & ÇEVİKER, D., 2001. Two extra-Mediterranean molluscs from southeast Turkey: *Siphonaria belcheri* Hanley, 1858 (Gastropoda: Siphonariidae) and *Septifer bilocularis* (Linnaeus, 1758) (Bivalvia: Veneridae). *Israel Journal of Zoology*, 47: 297-298.
- ²⁹ALBAYRAK, S., ASLAN, H. & BALKIS, H., 2001. A contribution to the Aegean Sea fauna: *Ruditapes philippinarum* (Adam & Reeve, 1850) [Bivalvia: Veneridae]. *Israel Journal of Zoology*, 47: 299-300.
- ³⁰ALBAYRAK, S., BALKIS, H. & BALKIS, N., 2004. Bivalvia (Mollusca) fauna of the Sea of Marmara. *Acta Adriatica*, 45 (1): 9-26.
- ³¹ALTAN, H., 1998. Ege'nin dibinde bir hayal alemi: Sarigerme. *Gezi, National Geographic Traveler*, 1: 60-75.
- ³²ARTÜZ, M.L., 2007. First Record of "pebble crab" *Leucosia signata* Paulson, 1875 in Sea of Marmara. *Journal of Applied Biological Sciences*, 1 (3): 107-108.
- ³³ATEŞ, A.S., 2003. *Türkiye'nin Ege Denizi Kıyıları Sublittoral Decapod (Crustacea) Türleri ve Biyo-ekolojik Özellikleri*. Doktora Tezi. Ege Üniversitesi Fen Bilimleri Enstitüsü, 225 pp.
- ³⁵ATEŞ, A.S., BAKIR, K., ÖZCAN, T. & KATAĞAN, T., 2009. Two New Records of Caridean Shrimps for the Turkish Waters: *Eaulus sollaudi* (Zariquiey Cenarro, 1935) (Caridea, Hippolyte) and *Palaemonella rotumana* (Borradaile, 1898) (Caridea, Palaemonidae). *Turkish Journal of Zoology*, 33: 469-472.
- ³⁴ATEŞ, A.S., KATAĞAN, T. & KOCATAŞ, A., 2004. New decapod species for the Turkish seas. *Crustaceana*, 77 (4): 507-512.
- ³⁷AVŞAR, D. & ÇİÇEK, E., 1999. A new species record for the central and eastern Mediterranean; *Sphoeroides cutaneus* (Günther, 1870) (Pisces: Tetraodontidae). *Oebalia*, 25: 17-21.
- ³⁶AVŞAR, N., 1997. Foraminifera of the Eastern Mediterranean Costline.

- Çukurova Üniversitesi Yerbilimleri (Geosound)*, 31: 67-81.
- ³⁸AVŞAR, N., MERİÇ, E. & ERGİN, M., 2001. İskenderun Körfezi bentonik sedimentlerinin foraminifer içeriği. *Hacettepe Üniversitesi Yerbilimleri*, 24: 97-112.
- ³⁹AYDIN, I., BAKIR, A.K. & GALİL, B.S., 2009. The first record of the Jinga shrimp *Metapenaeus affinis* (H. Milne Edwards, 1837) (Crustacea: Decapoda: Penaeidae) from the Mediterranean Sea. *Crustaceana*, 82 (8): 1091-1095.
- ⁴⁰AYSEL, V., 1984. Türkiye'nin Ege Denizi'ndeki *Polysiphonia* Greville (*Rhodomelaceae*, *Ceramiales*) türleri 1- Bölüm *Oligosiphonia*. *Doga Bilim Dergisi*, 8 (1): 29-42
- ⁴¹AYSEL, V., 1987. Türkiye'nin Ege Denizi Florası II. Kırmızı Algler (*Rhodophyta*). *Doga Türk Botanik Dergisi*, 11 (1): 1-21.
- ⁴²AYSEL, V., 1997a. Marine flora of Turkish Mediterranean coast 1. Red algae (*Rhodophyta*). *Turkish Journal of Botany*, 21: 155-163.
- ⁴³AYSEL, V., 1997b. Marine flora of Turkish Mediterranean coast 2. Brown algae (*Fucophyceae* = *Phaeophyceae*). *Turkish Journal of Botany*, 21: 329-334.
- ⁴⁴AYSEL, V. & ERDUĞAN, H., 1995. Check-list of Blacksea seaweeds, Türkiye (1823-1994). *Turkish Journal of Botany*, 19: 545-554.
- ⁴⁵AYSEL, V. & GEZERLER-ŞİPAL, U., 1996. Türkiye'nin Akdeniz kıyılarının deniz florası, 3. Cyanophyceae, Chlorophyceae, Charophyceae ve Angiospermae. *Ege Üniversitesi Su Ürünleri Fakültesi Dergisi*, 13: 247-257.
- ⁴⁸AYSEL, V., DURAL, B., GÖNÜZ, A. & OKUDAN, E.S., 1998. Kırklareli (Karadeniz, Trakya, Türkiye) deniz florası. *XIV Ulusal Biyoloji Kongresi, Samsun*, 2: 333-342.
- ⁵³AYSEL, V., DURAL, B., OKUDAN, E.S., ALPASLAN, M. & UYSAL, I., 2001. Gökçeada (Ege Denizi, Çanakkale, Türkiye) Deniz Florası. *Ulusal Ege Adaları 2001 Toplantısı Bildiriler Kitabı Tüdev. Yayın No 7: 125-141.*
- ⁵⁴AYSEL, V., DURAL, B., SUKATAR, A., GÜNER, H. & ERDUĞAN, H., 1996. Zonguldak Deniz Algleri, Karadeniz, Türkiye. *XIII Ulusal Biyoloji Kongresi, 17-20 Eylül, İstanbul*, 5: 311-321.
- ⁴⁹AYSEL, V., ERDUĞAN, H., DURAL-TARAKÇI, B. & OKUDAN, E.Ş. *et al.*, 2005. Marine algae and seagrass of Giresun shores (Black Sea, Turkey). *Journal of Black Sea/Mediterranean Environment*, 11 (3): 271-28
- ⁵⁵AYSEL, V., ERDUĞAN, H., DURAL-TARAKÇI, B., OKUDAN, E. *et al.*, 2004. Marine Flora of Sinop (Black Sea, Turkey), *Ege University Journal of Fisheries & Aquatic Sciences*, 21: 59-68.
- ⁴⁶AYSEL, V., GÜNER, H. & DURAL, B., 1993. Türkiye Marmara Denizi florası II. *Phaeophyta* ve *Rhodophyta*. *Ege Üniversitesi Su Ürünleri Fakültesi Dergisi*, 10: 115-168.
- ⁴⁷AYSEL, V., GÜNER, V. & ZEYBEK, N., 1984. Türkiye'nin bazı derin deniz algleri II. *Phaeophyta* (Esmer Algler). *Doğa Bilim Dergisi*, 8 (2): 183-192.
- ⁵⁰AYSEL, V., KESERCİOĞLU, T., GÜNER, H. & AKÇAY, H., 1990. Trabzon deniz algleri. p. 183-192. In: *X Ulusal Biyoloji Kongresi Erzurum (18-20 Temmuz, Erzurum, 1990)*. Atatürk Üniversitesi Fen - Edebiyat Fakültesi Botanik Bildirileri.
- ⁵¹AYSEL, V., ŞENKARDEŞLER, A., AYSEL, F. & ALPASLAN, M., 2000.

- Çanakkale Boğazı (Marmara Denizi, Türkiye) deniz Florası. p. 436-449. In: *Marmara Denizi 2000 Sempozyumu, 11-12 Kasım 2000, İstanbul.*
- ⁵²AYSEL, V., ZEYBEK, N., GÜNER, H. & SUKATAR, A., 1986. Türkiye'nin bazı derin deniz algleri III. *Rhodophyta* (Kırmızı Algler). *Doga Türk Biyoloji Dergisi*, 10 (1): 8-29.
- ⁵⁶BAŞUSTA, N. & ERDEM, Ü., 2000. Iskenderun Körfezi balıkları üzerine bir araştırma. *Turkish Journal of Zoology*, 24: 1-19.
- ⁵⁷BAŞUSTA, N., ERDEM, Ü. & MATER, S., 1997. Iskenderun körfezinde yeni bir Lesepsiyen göçmen balık türü; Kizilgözlü Sardalya, *Etrumeus teres* (Dekay, 1842). *Mediterranean Fisheries Congress*, İzmir: 921-924.
- ⁵⁸BAKIR, T., KATAĞAN, T., SEZGİN, M., 2008. *Parhyale explorator* Arresti, 1989 (Amphipoda, Talitroidea): First Mediterranean record of this Atlantic amphipod. *Crustaceana*, 81 (5): 557-562.
- ⁵⁹BAKIR, K., SEZGİN, M. & KATAĞAN, T., 2007. Contribution to the knowledge of alien amphipods off the Turkish coast: *Gammaropsis togoensis* (Schellenberg, 1925). *Journal of Aquatic Invasions*, 2 (1): 80-82.
- ⁶⁰BALKIS, H. & ÇEVİKER, D., 2003. A new exotic crab species [*Calappa hepatica* (Linnaeus, 1758)] for the Mediterranean fauna. *Israel Journal of Zoology*, 49: 320-321.
- BAX, N., WILLIAMSON, A., AGUERO, M., GONZALEZ, E. & GEEVES, W., 2003. Marine invasive alien species: a threat to global biodiversity. *Marine Policy*, 27 (4): 313-323.
- ⁶¹BEN-ELIAHU, M.N., 1989. Lessepsian migration in Nereidae (Annelida: Polychaeta). Some case histories. p. 125-134. In: *Proceedings of Environmental Quality and Ecosystem Stability*, E. Spanier, Y. Steinberger & M. Luria (Eds). ISEEQS Publications, Jerusalem, Israel
- ⁶²BEN-ELIAHU, M.N., 1991. Red Sea serpulids (Polychaeta) in the eastern Mediterranean. p. 515-528. In: *Proceedings of 2nd International Polychaeta Conference, Copenhagen, 1986*. M.E. Petersen & J.B. Kirkegaard (Eds). Ophelia, Suppl. 5.
- ⁶³BENLİ, H.A., CIHANGİR, B. & BİZSEL, K.C., 1999. Ege Denizi'nde bazı demersal balıkçılık kaynakları üzerine araştırmalar. *İstanbul Üniversitesi Su Ürünleri Dergisi*, Özel Sayı. 301-369.
- ⁶⁴BEN-TUVIA, A., 1953. Mediterranean fishes of Israel. *Bulletin of the Sea Fisheries Research Station*, 8: 1-40.
- ⁶⁵BEN-TUVIA, A., 1966. Red Sea fishes recently found in the Mediterranean. *Copeia*, 2: 254-275.
- ⁶⁶BEN-TUVIA, A., 1973. Man-made changes in the eastern Mediterranean Sea and their effect on the fishery resources. *Marine Biology*, 19: 197-203.
- ⁶⁷BİLECENOĞLU, M., 2002. Türkiye kıyılarında ilk kez rastlanan bir denizanası türü: *Cassiopea andromeda* (Forsskal, 1775) (Cassiopeidae, Scyphozoa). *Sualtı Dünyası Dergisi*, 72: 42-43.
- ⁶⁸BİLECENOĞLU, M., 2003. Kizildeniz Göçmeni Balon Balığı (*Torquigener flavimaculosus* Hardy & Randall, 1983), Türkiye kıyılarından ilk gözlemler. *Sualtı Dünyası Dergisi*, 74: 38-39.
- ⁶⁹BİLECENOĞLU, M., 2004. Occurrence of the Lessepsian migrant fish, *Sillago sihama* (Forsskal, 1775) (Osteichthyes: Sillaginidae), from the Aegean Sea. *Israel Journal of Zoology*, 50: 420-421.

- ⁷⁰BİLECENOĞLU, M., 2007. First record of *Monotaxis grandoculis* (Forsskål, 1775) (Osteichthyes, Lethrinidae) in the Mediterranean Sea. *Aquatic Invasions*, 2 (4): 466-467.
- BİLECENOĞLU, M., 2010. Alien marine fishes of Turkey—an updated review. p. 189-217. In: *Fish Invasions of the Mediterranean Sea: Change and Renewal*, D.Golani & B.Appelbaum-Golani (Eds), Sofia-Moscow, Pensoft Publishers.
- ⁷¹BİLECENOĞLU, M. & KAYA, M., 2006. A new alien fish in the Mediterranean Sea – *Platax teira* (Forsskål, 1775) (Osteichthyes: Ephippidae). *Aquatic Invasions*, 1 (2): 80-83.
- ⁷²BİLECENOĞLU, M. & RUSSELL, B.C., 2008. Record of *Nemipterus randalli* Russell, 1986 (Nemipteridae) from Iskenderun Bay, Turkey. *Cybi-um*, 32 (3): 279-280.
- ⁷³BİLECENOĞLU, M., KAYA, M. & AKALIN, S., 2006. Range expansion of silverstripe blaasop, *Lagocephalus sceleratus* (Gmelin, 1789), to the northern Aegean Sea. *Aquatic Invasions*, 1 (4): 289-291.
- ⁷⁴BİLECENOĞLU, M., KAYA, M. & ERYIGIT, A., 2009. New data on the occurrence of two alien fishes, *Pisodonophis semicinctus* and *Pomadasystridens*, from the Eastern Mediterranean Sea. *Mediterranean Marine Science*, 10 (2): 151-155.
- ⁷⁵BİLECENOĞLU, M., TAŞKAVAK, E. & KUNT, K.B., 2002a. Range extension of three Lessepsian migrant fish (*Fistularia commersoni*, *Sphyræna flavicauda*, *Lagocephalus suezensis*) in the Mediterranean Sea. *Journal of the Marine Biological Association of the United Kingdom*, 82: 525-526.
- ⁷⁷BİLECENOĞLU, M., TAŞKAVAK, E., MATER, S. & KAYA, M., 2002b. Checklist of the marine fishes of Turkey. *Zootaxa*, 113: 1-194.
- ⁷⁶BİLECENOĞLU, M., YOKEŞ, M.B. & ERYIGIT, A., 2008. First record of *Vanderhorstia mertensi* Klausewitz, 1974 (Pisces, Gobiidae) in the Mediterranean Sea. *Aquatic Invasions*, 3 (4): 475-478.
- BLANC-VERNET, L., CLAIREFOND, P. & ORSOLINI, P., 1979. Les foraminifères. *Annales de l'Université de Provence*, 6: 171-209.
- ⁷⁸BLÖCHER, M., 1983. A dead specimen of *Palmadusta gracilis* (Gaskoin, 1849) found in the Mediterranean. *La Conchiglia*, 10: 166-167.
- ⁷⁹BOGI, C., BUZZURRO, G. & GREPPI, E., 1995. Presenza di *Murchisonella columna* (Hedley, 1907) Nel Mediterraneo Orientale. *Bollettino Malacologico*, 31 (1-4): 69-76.
- ⁸⁰BUHAN, E., YILMAZ, H., MORKAN, Y., BÜKE, E. & YÜKSEK, A., 1997. Güllük ve Gökova Körfezleri için yeni bir av potansiyeli: *Scomberomorus commerson* (Lacepède, 1800) (Pisces-Teleostei). *Mediterranean Fisheries Congress*, Izmir: 937-944.
- ⁸¹BUYUKBAYKAL, F., 2002. *Syphonota geographica* from Turkey. [Message in] Sea Slug Forum. Australian Museum, Sydney. Available from <http://www.seaslugforum.net/find.cfm?id=8637>.
- ⁸²BUZZURRO, G. & CECALUPO, A., 2006. I molluschi lessepsiani di Taşucu (Turchia sud-orientale): Descrizione di *Parviturbo dibellai* n.sp. (Gastropoda: Trochoidea: Skeneidae). *Bollettino Malacologico*, 42: 27-32
- ⁸³BUZZURRO, G. & GREPPI, E., 1994. Presenza di *Smaragdella (Smaragdella) souverbiana* (Montrouzier, 1836) nel Mediterraneo Orientale. *Bollettino*

- Malacologico*, 29: 319-321.
- ⁸⁴BUZZURRO, G. & GREPPI, E., 1996. The lessepsian molluscs of Tasucu (South-East Turkey). *La Conchiglia*, 279 (Suppl.): 3-22.
- ⁸⁵BUZZURRO, G., HOARAU, A., GREPPI, E. & PELORCE, J., 2001. Prima segnalazione di *Hinemoa cylindrica* (de Folin, 1879) per il Mediterraneo. *Bollettino Malacologico*, 37 (1-4): 23-26.
- CARLTON, J.T., 1985. Transoceanic and interoceanic dispersal of coastal marine organisms: the biology of ballast water. *Oceanography & Marine Biology: An Annual Review*, 23: 313-371.
- CARLTON, J.T., 1996. Biological invasions and cryptogenic species. *Ecology*, 77: 1653-1655
- ⁸⁶CEYHAN, T. & AKYOL, O., 2008. A new record of the Red Sea pebble crab, *Ixa monodi* Holthuis & Gottlieb, 1956 (Crustacea: Decapoda) from the Aegean Coast of Turkey. *Aquatic Invasions*, 3 (2): 239-241.
- ⁸⁷CİHANGİR, H.A., SEZGİN, M. & TUNCER, S., 2009. New records of two species of amphipods *Melphidippella macra* (Norman, 1869) and *Monocorophium sextonae* (Crawford, 1937)) for Turkish Seas. *Crustaceana*, 82 (1): 111-116.
- ⁸⁸CİRİK, S., 1986. A propos de la végétation marine de la baie d'Akkuyu, Mersin, Turquie. p. 69-81. In: *5th OPTIMA Meeting, Istanbul*.
- ⁸⁹CİRİK, S. & CİRİK, S., 1995. Evolution des aires de développement de *Caulerpa racemosa* et *Halophila stipulacea* sur les côtes orientale de la Méditerranée (Turquie). In: 11ème Congrès National d'Ecologie et d'Environnement, 11-13 September 1995, Anakara, Turkey, 13 p.
- ⁹⁰CİRİK, S. & ÖZTÜRK, B., 1991. Notes sur la présence d'une forme rare du *Caulerpa racemosa* en Méditerranée orientale. *Flora Mediterranea*, 1: 217-219.
- ⁹¹CİRİK, S. & TOLAY, M., 1999. News for the Spreading of the Invasive Seaweeds (*Caulerpa taxifolia* & *Caulerpa racemosa*) in The Turkish Newspapers, Magazines and Televisions. In: *Fourth International Workshop on Caulerpa taxifolia, 1-2 February, 1999, Lerici-Italia*.
- ⁹²CİRİK, S., CİRİK, S., ALPBAZ, A., GÖKPINAR, Ş. & METİN, C., 1990. Recherches sur la flore marine de la lagune d'Homa (Baie d'İzmir, Turquie). *Rapport de la Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée*, 32: 78.
- CORSINI, M., MARGIES, P., KONDILATOS, G. & ECONOMIDIS, P.S., 2005. Lessepsian migration of fishes to the Aegean Sea: First record of *Tylerius spinosissimus* (Tetraodontidae) from the Mediterranean, and six more fish records from Rhodes. *Cybium*, 29 (4): 347-354.
- ⁹³ÇEVİK, C. & ÖZTÜRK, B., 2001. A new lessepsian mollusc *Hypselodoris infucata* (Rüppell & Leuckart, 1828) (Gastropoda: Nudibranchia) for the coasts of Turkey. *Turkish Journal of Zoology*, 25: 27-30.
- ÇEVİK, C., DERİCİ, O.B., ÇEVİK F. & CAVAS, L., 2011. First record of *Phyllorhiza punctata* von Lendenfeld, 1884 (Scyphozoa: Rhizostomeae: Mastigiidae) from Turkey. *Aquatic Invasions*, 6 (Suppl. 1): 27-28.
- ⁹⁵ÇEVİK, C., DOĞAN, A., ÖNEN, M. & ZENETOS, A., 2005. First record of the Indo-Pacific species *Electroma vex-*

- illum* (Mollusca: Bivalvia: Pterioidea) in the eastern Mediterranean. *JMBA2, Biodiversity Records*, 1 (e1): 1-4. (Published online)
- ⁹⁴ÇEVİK, C., ÖZTÜRK, B. & BUZZURRO, G., 2001. The presence of *Crassostrea virginica* (Gmelin, 1791) and *Saccostrea commercialis* (Iredale & Roughley, 1933) in the eastern Mediterranean Sea. *La Conchiglia*, 298: 25-28.
- ⁹⁶ÇEVİK, C., YOKEŞ, M.B., CAVAS, L., ERKOL, L.I., DERICI, O.B. & VERLAQUE, M., 2007. First report of *Caulerpa taxifolia* (Bryopsidales, Chlorophyta) on the Levantine Coast (Turkey, Eastern Mediterranean). *Estuarine, Coastal & Shelf Sciences*, 74 (3): 549-556.
- ⁹⁷ÇEVİKER, D., 2001. Recent immigrant Bivalves in the northeastern Mediterranean off Iskenderun. *La Conchiglia*, 298: 39-46.
- ⁹⁸ÇEVİKER, D. & ALBAYRAK, S., 2002. New record of an exotic Bivalve from the southeastern coast of Turkey: *Scapharca inflata* (Reeve, 1844). *La Conchiglia*, 305: 56-60.
- ⁹⁹ÇEVİKER, D. & ALBAYRAK, S., 2006. Three alien molluscs from Iskenderun Bay (SE Turkey). *Aquatic Invasions*, 1 (2): 76-79.
- ¹¹⁴ÇİÇEK, E. & BİLECENOĞLU, M., 2009. A new alien fish in the Mediterranean Sea: *Champsodon nudivittis* (Actinopterygii: Perciformes: Champsodontidae). *Acta Ichthyologica et Piscatoria*, 39: 67-69.
- ¹⁰⁰ÇINAR, M.E., 2006. Serpulid species (Polychaeta: Serpulidae) from the Levantine coast of Turkey (eastern Mediterranean), with special emphasis on alien species. *Aquatic Invasions*, 1 (4): 223-240.
- ¹⁰¹ÇINAR, M.E., 2007. Re-description of *Timarete punctata* (Polychaeta: Cirratulidae) and its occurrence in the Mediterranean Sea. *Scientia Marina*, 71 (4): 755-764.
- ¹⁰²ÇINAR, M.E., 2009. Alien polychaete species (Annelida: Polychaeta) on the southern coast of Turkey (Levantine Sea, eastern Mediterranean), with 13 new records for the Mediterranean Sea. *Journal of Natural History*, 43: 2283-2328.
- ¹⁰³ÇINAR, M.E. & ERGEN, Z., 1998. Polychaetes associated with the sponge *Sarcotragus muscarum* Schmidt, 1864 from the Turkish Aegean Coast. *Ophelia*, 48: 167-183.
- ¹⁰⁴ÇINAR, M.E. & ERGEN, Z., 1999. Occurrence of *Prionospio saccifera* (Spionidae: Polychaeta) in the Mediterranean Sea. *Cahiers de Biologie Marine*, 40: 105-112.
- ¹⁰⁵ÇINAR, M.E. & ERGEN, Z., 2005. Lessepsian migrants expanding their distributional ranges; *Pseudonereis anomala* (Polychaeta: Nereididae) in Izmir Bay (Aegean Sea). *Journal of the Marine Biological Associations of the United Kingdom*, 85: 313-321.
- ¹⁰⁶ÇINAR, M.E. & ERGEN, Z., 2007. The presence of *Chaetozone corona* (Polychaeta: Cirratulidae) in the Mediterranean Sea: an alien or a native species? *Cahiers de Biologie Marine*, 48: 339-346.
- ¹¹²ÇINAR, M.E., BALKIS, H., ALBAYRAK, S., DAĞLI, E., KARHAN, S.Ü., 2009. Distribution of polychaete species (Annelida: Polychaeta) on the polluted soft substrate of the Golden Horn Estuary (Sea of Marmara), with special emphasis on alien species. *Cahiers de Biologie Marine*, 50: 11-17.

- ¹¹⁰ÇINAR, M.E., BILECENOĞLU, M., ÖZTÜRK, B. & CAN, A., 2006a. New records of alien species on the Levantine coast of Turkey. *Aquatic Invasions*, 1 (2): 84-90.
- ÇINAR, M.E., BİLECENOĞLU, M., ÖZTÜRK, B., KATAGAN, T. & AYSEL, V., 2005a. Alien species on the coasts of Turkey. *Mediterranean Marine Science*, 6 (2): 119-146.
- ¹⁰⁷ÇINAR, M.E., DAĞLI, E. & AÇIK, S., 2011. Annelids (Polychaeta and Oligochaeta) from the Sea of Marmara, with descriptions of five new species. *Journal of Natural History*, in press.
- ¹⁰⁸ÇINAR, M.E., ERGEN, Z. & DAĞLI, E., 2002. Occurrence of the lessepsian species *Leonnates persicus* (polychaeta: Nereididae) in Izmir Bay, Aegean Sea. *Journal of the Marine Biological Associations of the United Kingdom*, 82: 811-815.
- ¹⁰⁹ÇINAR, M.E., ERGEN, Z. & DAĞLI, E., 2004. New records of polychaetes from the Turkish Aegean coast. *Rapport de la Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée*, 37: 508.
- ¹¹¹ÇINAR, M.E., ERGEN, Z., DAĞLI, E. & PETERSEN, M.E., 2005b. Alien species of spionid polychaetes (*Streblospio gynobranchiata* and *Polydora cornuta*) in Izmir Bay, eastern Mediterranean. *Journal of the Marine Biological Associations of the United Kingdom*, 85: 821-827.
- ¹¹³ÇINAR, M.E., KATAĞAN, T., KOÇAK, F., ÖZTÜRK, B., ERGEN, Z. *et al.*, 2008. Faunal assemblages of the mussel *Mytilus galloprovincialis* in and around Alsancak Harbour (Izmir Bay, eastern Mediterranean) with special emphasis on alien species. *Journal of Marine Systems*, 71: 1-17.
- ÇINAR, M.E., KATAGAN, T., ÖZTÜRK, B., EGEMEN, Ö., ERGEN, Z. *et al.*, 2006b. Temporal changes of soft bottom zoobenthic communities in and around Alsancak Harbor (Izmir Bay, Aegean Sea), with special attention to the autoecology of exotic species. *Marine Ecology*, 27 (3): 229-246.
- ¹¹⁵DAĞLI, E. & ÇINAR, M.E., 2008. Invasion of polluted soft substratum of Izmir Bay (Aegean Sea, eastern Mediterranean) by the spionid polychaete worm, *Pseudopolydora paucibranchiata* (Polychaeta: Spionidae). *Cahiers de Biologie Marine*, 49: 87-96.
- ¹¹⁶DAĞLI, E. & ÇINAR, M.E., 2009. Species of the subgenera *Aquilaspio* and *Prionospio* (Polychaeta: Spionidae: *Prionospio*) from the southern coast of Turkey (Levantine Sea, eastern Mediterranean), with description of a new species and two new reports for the Mediterranean fauna. *Zootaxa*, 2275: 1-20.
- ¹¹⁷DAĞLI, E. & ÇINAR, M.E., 2010. Presence of the Australian spionid species, *Prionospio paucipinnulata* (Polychaeta: Spionidae), in the Mediterranean Sea. *Cahiers de Biologie Marine*, 51: 311-317.
- ¹¹⁸DAĞLI, E. & ERGEN, Z., 2008. First record of *Polydora cornuta* Bosc, 1802 (Polychaeta: Spionidae) from the Sea of Marmara, Turkey basin. *Aquatic Invasions*, 3 (2): 225-227.
- ¹¹⁹DAĞLI, E., ÇINAR, M.E. & ERGEN, Z., 2011. Spionidae (Annelida: Polychaeta) from the Aegean Sea (eastern Mediterranean). *Italian Journal of Zoology*, in press.
- ¹²⁰DALYAN, C. & ERYILMAZ, L., 2009. The Arabian scad *Trachurus indicus* Nekrasov, 1966, a new Indo-Pacific

- species in the Mediterranean Sea. *Journal of Fish Biology*, 74: 1615-1619.
- ¹²¹DELONGUEVILLE, C. & SCAILLET, R., 2007. Les espèces invasives de mollusques en Méditerranée. *Novapex*, 8: 47-70.
- ¹²²DELONGUEVILLE, C. & SCAILLET, R., 2010. Echantillonnage de mollusques invasifs et première signalisation de *Chama aspersa* Reeve, 1846 à Chypre Nord. *Novapex/Société*, 11 (1): 3-7.
- ¹²³DEMİR, M., 1954. Bogazlar ve adalar sahillerinin omurgasız dip hayvanları. *Istanbul Üniversitesi Fen Fakültesi Hidrobioloji Araştırma Enstitüsü Yayınlarından*, 3: 615 pp.
- ¹²⁴DEMİR, M., 1977. On the presence of *Arca (Scapharca) amygdalum* Philippi, 1847 in the harbour of Izmir, Turkey. *Istanbul Üniversitesi Fen Fakültesi Mecmuası*, 42: 197-202.
- ¹²⁵DEVAL, M.C., KAYA, Y., GUVEN, O., GOKOGLU, M. & FROGLIA, C., 2010. An unexpected find of te western Atlantic shrimp, *Farfantepenaeus aztecus* (Ives,1891) (Decapoda, Penaeidea) in Antalya Bay, eastern Mediterranean Sea. *Crustaceana*, 83 (12): 1531-1537.
- EKER, E. & KIDEYŞ, A.E., 2000. Weekly variations in phytoplankton structure of a harbour in Mersin Bay (northeastern Mediterranean). *Turkish Journal of Botany*, 24: 13-24.
- ¹²⁶ENGL, W., 1995. Specie prevalentemente lessepsiane attestate lungo le coste Turche. *Bollettino Malacologico*, 31 (1-4): 43-50.
- ¹²⁷ENGL, W. & ÇEVİKER, D., 1999. New migrant species from southeast Turkey *Psammotreta praerupta* (Salisbury, 1934) and *Antigona lamellaris* Schumacher, 1817. *La Conchiglia*, 290: 17-20.
- ¹²⁸ENZENROSS, R. & ENZENROSS, L., 1987. Studie über das Vorkommen von Mollusca und Crustacea an der türkischen Küste (Mittelmeer und Agais). *Ravensburg, unveröffentlichtes Manuskript*, 2-17.
- ¹²⁹ENZENROSS, R. & ENZENROSS, L., 1995. Erstnachweis indopazifischer Brachyura (Crustacea: Decapoda) von der türkischen Mittelmeerküste. *Stuttgarter Beiträge zur Naturkunde, Serie A (Biologie)*, 521: 1-4.
- ¹³⁰ENZENROSS, L., ENZENROSS, R., NIEDERHÖFER, H.J., 1990. Wissenschaftlich interessante Funde aus der Sammlung Enzenross (Marine Invertebraten). *Jahreshefte der Gesellschaften fuer Naturkunde in Wuerttemberg*, 145: 283-94.
- ¹³¹ERAZI, R.A.R., 1943. *Leiofnathus mediterraneus* nov. sp. *Compte Rendu Société Turquie des Sciences physiques et naturelles*, 10: 49-53.
- ¹³²ERDUĞAN H., AKI, C., ACAR, O., DURAL, B., AYSEL, V., 2009a. New record for the east Mediterranean, Dardanelles (Turkey) and its distribution: *Polysiphonia morrowii* Harvey (Ceramiales, Rhodophyta). *Turkish Journal of Fisheries & Aquatic Sciences*, 9: 231-232.
- ¹³³ERDUĞAN, H., AYSEL, V., DURAL, B., AKGUL, R., BALIKÇI, Ö. *et al.*, 2009b. A new record for *Caulerpa mexicana* Soder ex Kützing from eastern Mediterranean coast of Turkey. *Journal of Black Sea/ Mediterranean Environment*, 15: 5-13.
- ¹³⁴ERGEN, Z., 1976. Investigations on the taxonomy and ecology of Polychaeta from Izmir Bay and its adjacent areas. *Scientific Reports of the Faculty of Science, Ege University*, 209: 1-73.

- ¹³⁵ERGEN, Z. & ÇINAR, M.E., 1997. Polychaeta of Antalya Bay (Mediterranean coast of Turkey). *Israel Journal of Zoology*, 43: 229-241.
- ¹³⁶ERGEN, Z., ÇINAR, M.E., DAĞLI, E. & KURT, G., 2002. Lessepsian polychaete species from the Turkish coasts. p. 50-55. In: *Proceedings of Workshop on Lessepsian Migration*, B. Öztürk & N. Basusta (Eds). Turkish Marine Research Foundation, 9.
- ¹³⁷ERGEV, M.B., ÇINAR, M.E., MUTLU, E. & ERGEN, Z., 2003. Ecological features of the lessepsian migrant *Leonnates persicus* (Polychaeta: Nereididae) from the Levant coast of Turkey. *Journal of the Marine Biological Associations of the United Kingdom*, 83: 1225-1226.
- ¹³⁸ERTAN, Ö., TURNA, O.I. & CORMACI, M., 1998. A new record for the marine algal flora of Turkey: *Caulerpa scalpelliformis* (Brown ex Turner) C. Agardh (*Caulerpaceae*, *Chlorophyceae*). *Turkish Journal of Botany*, 22: 285-287.
- ¹³⁹ERYILMAZ, S. & DALYAN, C., 2006. First record of *Apogon queketti* Gilchrist (Osteichthyes: Apogonidae) in the Mediterranean Sea. *Journal of Fish Biology*, 69 (4): 1251-1254.
- ¹⁴⁰ERYILMAZ, S., ÖZULUG, M. & MERİÇ, N., 2003. The smooth pufferfish, *Sphoeroides pachygaster* (Müller & Troschel, 1848) (Teleostei: Tetraodontidae), new to the Northern Aegean Sea. *Zoology in the Middle East*, 28: 125-126.
- ¹⁴¹EVIRGEN, A., 1997. Katil yosunlar aramızda. *Sualtı Dünyası*, Kasım 1997, 10-14.
- ¹⁴²FALAKALI MUTAF, B., AKŞİT, D. & GÖKOĞLU, M., 2005. Some marine gastropods first recorded from Antalya Bay, Turkey (the Mediterranean Sea). *JMBA2, Biodiversity Records*, 1 (e15): 1-6.
- ¹⁴³FALCHI, S., 1974. Molluschi di provenienza Indopacifica lungo le coste Turche. *Conchiglie*, Milano, 10 (3-4): 89.
- ¹⁴⁴FİLİZ H., AKÇINAR, S.C., ULUTÜRK, E., BAYHAN, B., TAŞKAVAK, E. *et al.*, 2007. New records of *Bregmaceros atlanticus* (Bregmacerotidae), *Echiodon dentatus* (Carapidae), and *Nemichthys scolopaceus* (Nemichthyidae) from the Aegean Sea. *Acta Ichthyologica et Piscatoria*, 37: 107-112.
- ¹⁴⁵FİLİZ, H., BİLGE, G. & YAPICI, S., 2010. Lessepsian fishes in south Aegean (western Mediterranean): a new contribution and distribution expansion. In: *Western Mediterranean Natural Sciences Symposium, 4-6 November 2010*, Mehmet Akif Ersoy University, Burdur.
- ¹⁴⁶FISCHER-PIETTE, E., 1960. *Rapana bezoar* I. sur la cote Turquie de la mer Noire. *Hydrobiologie*, Serie B5, 1-2: 51.
- ¹⁴⁷FISCHER, W., 1973. *Fiches FAO d'identification des espèces pour les besoins de la pêche. Méditerranée et mer Noire - Zone de pêche 37*. FAO, Rome.
- ¹⁴⁸FRITSCH, K., 1899. Beitrag zur flora von Constantinopel. I. Kryptogamen. *Denkschriften der kaiserlichen Akademie der Wissenschaften zu Wien Math*, 68: 219-250.
- GALIL, B.S., 2007. Seeing Red: Alien species along the Mediterranean coast of Israel. *Aquatic Invasions*, 2 (4): 281-312.
- ¹⁴⁹GALIL, B.S., FROGLIA, C. & NOEL, P., 2005. www.ciesm.org/atlas/appendix2.html [Accessed in 2008].
- ¹⁵⁰GALIL, B.S., YOKEŞ, M.B., GOREN,

- M. & DIAMANT, A., 2009. First record of the Indo-West Pacific mantis shrimp, *Clorida albolitura* Ahyong & Naiyanetr, 2000 (Stomatopoda, Squillidae) in Turkey. *Aquatic Invasions*, 4 (4): 701-702.
- ¹⁵¹GELDİAY, R., 1969a. Doğu Akdenizden İzmir Körfezine kadar olan sahil boyunca toplanan Natantia (Crustacea-Decapoda) türleri üzerine bir araştırma. *Ege Üniversitesi Fen Fakültesi İlimi Raporlar Serisi*, 1-74.
- ¹⁵²GELDİAY, R., 1969b. İzmir Körfezinin baslıca balıkları ve muhtemel invasyonları. *Ege Üniversitesi Fen Fakültesi Monografileri, İzmir*, 135 pp.
- ¹⁵³GELDİAY, R. & KOCATAŞ, A., 1968. Türkiye'nin Akdeniz Sahillerinden Tesbit Edilen Penaeidae Familyası Türleri Hakkında. *Ege Üniversitesi Fen Fakültesi İlimi Raporlar Serisi*, 58: 3-15.
- ¹⁵⁴GIUNCHI, L., MICALI, P. & TISSELLI, M., 2001. Report of two new lessepsian immigrants from Turkey. *La Conchiglia*, 298: 47-48.
- GLACON, G., 1962. *Foraminifères des dépôts actuels des côtes de Tunisie Sud Orientale*. Thèse de Doctorat Université de Montpellier, France, 270 pp.
- GODWIN, L.S., ELDREDGE, L.G. & GAUT, K., 2004. The assessment of hull fouling as a mechanism for the introduction and dispersal of marine alien species in the main Hawaiian Islands. *Bishop Museum Technical Report*, 28: 1-114.
- GOLANI, D., 2004. First record of the muzzled blenny (Osteichthyes: Blenniidae: *Omobranchus punctatus*) from the Mediterranean, with remarks on ship-mediated fish introduction. *Journal of the Marine Biological Association of the United Kingdom*, 84: 851-852.
- GOLANI, D., ORSI-RELINI, L., MASSUTI, E. & QUIGNARD, J.P., 2002. *CIESM atlas of exotic species in the Mediterranean. Vol.1, Fishes*. CIESM Publishers, Monaco, 256 pp.
- GOLANI, D., SONIN, O. & EDELIST, D., 2011. Second records of the Lessepsian fish migrants *Priacanthus sagittarius* and *Platax teira* and distribution extension of *Tylerius spinosissimus* in the Mediterranean. *Aquatic Invasions*, 6 (Suppl. 1): 7-11.
- GOLLASCH, S., 2007. Is ballast water a major dispersal mechanism for marine organisms? p. 29-57. In: *Biological Invasions*. Nentwig W. (Ed). Ecological Studies 193, Springer-Verlag Berlin Heidelberg.
- GOODENOUGH, A.E., 2010. Are the ecological impacts of alien species misrepresented? A review of the "native good, alien bad" philosophy. *Community Ecology*, 11: 13-21.
- GOREN, M. & GALIL, B.S., 2006. Additional records of *Bregmaceros atlanticus* in the eastern Mediterranean—an invasion through the Suez Canal or in ballast water? *JMBA2-Biodiversity Records*, 1 (e42): 1-3. (Published online)
- GOREN, M., GAYER, K. & LAZARUS, N., 2009. First record of the far east chameleon goby *Tridentiger trigonocephalus* (Gill, 1859) in the Mediterranean Sea. *Aquatic Invasions*, 4 (2): 413-415.
- ¹⁵⁵GOREN, M., YOKEŞ, M.B, GALIL, B.S. & DIAMANT, A. 2008. Indo-Pacific cardinal fishes in the Mediterranean Sea—new records of *Apogon smithi* from Turkey and *A.queketti* from Israel. *JMBA2-Biodiversity Records*, 6417: 1-5.
- ¹⁵⁶GÖKOĞLU, M. & ÖZGÜR, E., 2008. First report of *Chromodoris annulata*

- Eliot, 1904 (Mollusca, Opisthobranchia, Chromodorididae) on the Levantine coast of Turkey, Eastern Mediterranean. *Aquatic Invasions*, 3 (4): 435-437.
- ¹⁵⁷GÖKOĞLU, M., BODUR, T. & KAYA, Y., 2003. First record of the Red Sea bannerfish (*Heniochus intermedius* Steindachner, 1893) from the Mediterranean Sea. *Israel Journal of Zoology*, 49: 324-325.
- ¹⁵⁸GÖKOĞLU, M., BODUR, T. & KAYA, Y., 2004. First records of *Hippocampus fuscus* and *Syngnathus rostellatus* (Osteichthyes: Syngnathidae) from the Anatolian coast (Mediterranean Sea). *Journal of the Marine Biological Association of the United Kingdom*, 84: 1093-1094.
- GÓMEZ, F., 2006. Endemic and Indo-Pacific plankton in the Mediterranean Sea: a study based on dinoflagellate records. *Journal of Biogeography*, 33: 261-270.
- GÓMEZ, F., 2008. Phytoplankton invasions: Comments on the validity of categorizing the non-indigenous dinoflagellates and diatoms in European Seas. *Marine Pollution Bulletin*, 56 (4): 620-628.
- ¹⁵⁹GRIPPA, G., 1982. First record of *Leucosia signata* Paulson, 1875 from the south-western Turkish coast (Decapoda, Brachyura, Leucosidae). *Quaderni del Laboratorio di Tecnologia della Pesca, Ancona*, 3: 335-338.
- GROSS, O., 2010. *Coscinospira arietina* (Batsch, 1791). Accessed through: World Register of Marine Species at <http://www.marinespecies.org/aphia.php?p=taxdetails&id=112794> on 2011-04-14.
- ¹⁶⁰GRUVEL, A., 1928. Répartition géographique de quelques Crustacés comestibles sur les côtes d'Égypte et syrie. *Comptes Rendus de la Société de Biogéographie*, 5: 45-46.
- ¹⁶¹GRUVEL, A., 1930. Sur les principales zones chalutables de la Méditerranée orientale. Carte de pêche du golfe d'Alexandrette. *Exploitation actuelle Avenir Revue Scientifique*, Paris, 190: 477-479.
- ¹⁶²GÜCÜ, A.C., BİNGEL, F., AVŞAR, D. & UYSAL, N., 1994. Distribution and occurrence of Red Sea fish at the Turkish Mediterranean coast-northern Cilician Basin. *Acta Adriatica*, 34: 103-113.
- ¹⁶³GÜNER, H., 1970. Ege Denizi sahil algleri üzerinde taksonomik ve ekolojik araştırma. *Ege Üniversitesi Fen Fakültesi İlmî Raporlar Serisi*, 76: 1-77.
- ¹⁶⁴GÜNER, H. & AYSEL, V., 1977. İzmir Körfezi'nde bulunan bazı *Ulva* türleri (*Chlorophyta*) hakkında taksonomik araştırma. *Ege Üniversitesi Fen Fakültesi Dergisi*, 1: 241-251.
- ¹⁶⁵GÜNER, H., AYSEL, V., SUKATAR, A. & ÖZTÜRK, M., 1984. Check list of İzmir Bay marine algae II. Phaeophyceae, Chlorophyceae and Cyanophyceae. *Ege Üniversitesi Fen Fakültesi Dergisi*, 7: 57-65.
- ¹⁶⁷GÜNER, H., AYSEL, V., SUKATAR, A. & ÖZTÜRK, M., 1985. Türkiye Ege Denizi Florası I. Mavi-Yesil, Yesil, Esmer Algler ve Kapalı Tohumlular. *Doga Bilim Dergisi*, 9: 272-282.
- ¹⁶⁷HAJDERI, E., 1995. Osservazioni sui copepodi del Mare di Marmara. *Biologia Marina Mediterranea*, 2: 541-542.
- HAUNOLD, T.G., BAAL, C. & PILLER, W.E., 1998. Larger Foraminifera. *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft*, 548: 155-180.
- ¹⁶⁸HOLTHUIS, L.B., 1961. Report on a

- collection of Crustacea Decapoda and Stomatopoda from Turkey and the Balkans. *Zoologische Verhandelingen*, 47: 1-67.
- ¹⁶⁹HOLTHUIS, L.B. & GOTTLIEB, E., 1956. Two interesting crabs (Crustacea: Decapoda: Brachyura) from Mersin Bay, SE Turkey. *Zoologische Mededelingen*, 34: 287-299.
- HOTTINGER, L., HALICZ, E. & REISS, Z., 1993. Recent foraminifera from the Gulf of Aqaba, Red Sea. *Slovenska Akademija Znanosti in Umetnosti*, 33: 1-179.
- ¹⁷⁰İŞİNİBİLİR, M., TARKAN, A.N. & KIDEYS, A.E., 2004. Decreased levels of the invasive ctenopore *Mnemiopsis* in the Marmara Sea in 2001. p. 155-165. In: *Aquatic invasions in the Black, Caspian and Mediterranean Seas*, Kluwer Academic Publishers, Dordrecht, The Netherlands.
- JENSEN, K.R. & KNUDSEN, J., 2005. A summary of alien marine benthic invertebrates in Danish waters. *Oceanological & Hydrobiological Studies*, 34: 137-162.
- ¹⁷¹KAMINSKI, M.A., AKSU, A., BOX, M., HISCOTT, R. N., FILIPESCU, S. & AL-SALAMEEN, M., 2002. Late glacial to Holocene benthic foraminifera in the Marmara Sea. Implications for Black Sea-Mediterranean Sea connections following the last deglaciation. *Marine Geology*, 190 (1-2): 165-202.
- ¹⁷²KARHAN, S.Ü. & YOKEŞ, B., 2009. Additional records of the alien gastropod, *Ergalatax junionae* Houart, 2008 (Gastropoda: Muricidae), from the eastern Mediterranean. *Mediterranean Marine Science*, 10 (1): 137-142.
- ¹⁷³KARHAN, S.Ü., KALKAN, E. & YOKEŞ, M.B., 2007. First record of the Atlantic starfish, *Asterias rubens* (Echinodermata: Asteroidea) from the Black Sea. *JMBA Biodiversity Records*, 1 (e63): 1-3. (Published online)
- ¹⁷⁴KATAĞAN, T., 1983. Türkiye'nin Ege Denizi littoral kumase'leri üzerine sistematik ve ekolojik araştırmalar. *Ege University Faculty of Science Journal*, Serie B, 6: 9-18.
- ¹⁷⁵KATAĞAN, T., KOCATAŞ, A., ZENGİN, M. & ATEŞ, A.S., 2004. An Indo-Pacific stomatopod from the Sea of Marmara: *Erugosquilla mas-savensis* (Kossmann, 1880). *Crustaceana*, 77: 381-383.
- KATSANEVAKIS, S., POURSANIDIS, D., YOKEŞ, B., MAÇIC, V., BEQIRAJ, S. et al., 2011. Twelve years after the first report of the crab *Percnon gibbesi* (H. Milne Edwards, 1853) in the Mediterranean: current distribution and invasion rates. *Journal of Biological Research*, 16: 224-236.
- ¹⁷⁶KAYA, M., MATER, S. & BENLİ, H.A., 1992. A new Indo-Pacific gobiid fish *Oxyurichthys papuensis* (Val., 1837) for eastern Mediterranean coasts of Turkey. *Rapport de la Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée*, 33: 298.
- ¹⁷⁷KAYA, M., MATER, S. & KORKUT, A.Y., 1998. A new grey mullet species "*Mugil so-ıuy Basilewsky*" (Teleostei: Mugilidae) from the Aegean coast of Turkey. *Turkish Journal of Zoology*, 22: 303-306.
- ¹⁷⁸KIDEYS, A.E. & GÜCÜ, A.C., 1995. *Rhopilema nomadica*: A poisonous indopacific scyphomedusan new to the Mediterranean coast of Turkey. *Israel Journal of Zoology*, 41: 615-617.
- ¹⁷⁹KIDEYS, A.E. & NIERMANN, U.,

1994. Occurrence of Mnemiopsis along the Turkish coasts (from north-eastern Mediterranean to Istanbul). *ICES Journal of Marine Science*, 51: 423-427.
- ¹⁸⁰KIDEYS, A.E., & ROMANOVA, Z., 2001. Distribution of gelatinous macrozooplankton in the southern Black Sea during 1996-1999. *Marine Biology*, 139 (3): 535-547.
- ¹⁸¹KINZELBACH, R., 1985. Lesseps'sche wanderung: neue stationen von muscheln (Bivalvia: Anisomyaria). *Archiv für Molluskenkunde*, 115 (4-6): 273-278.
- ¹⁸²KIRKIM, F., 1998. *Ege Denizi Isopoda (Crustacea) Faunasının Sistematigi ve Ekolojisi Üzerine Araştırmalar*. Doktora Tezi. Ege Üniversitesi Fen Bilimleri Enstitüsü, 238 pp.
- KISSELEVA, M.I., 1981. Tropical structure of some benthic communities of Adriatic Sea. *Rapport de la Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée*, 27: 137-138.
- ¹⁸³KNIGHT-JONES, P., KNIGHT-JONES, W. & ERGEN, Z., 1991. Sabelliform polychaetes, mostly from Turkey's Aegean coast. *Journal of Natural History*, 25: 837-858.
- ¹⁸⁴KOCATAŞ, A., 1971. İzmir Körfezi ve Civarı yengeçlerinin Brachyura Taksonomi ve Ekolojisi Üzerine Araştırmalar (Investigations on the taxonomy and ecology of crabs Brachyura from İzmir Bay and its adjacent areas). *Ege Üniversitesi Fen Fakültesi İlimi Raporlar Serisi*, 121: 1-77.
- ¹⁸⁵KOCATAŞ, A., 1981. Liste préliminaire et repartition des Crustacea Decapodes des eaux Turques. *Rapport de la Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée*, 27: 161-162.
- ¹⁸⁶KOCATAŞ, A. & KATAGAN, T., 1978. Türkiye denizlerinin littoral bentik amphipod'lari ve yayıllari. *TÜBİTAK Temel Bilimler Arastırma Grubu*, Proje No.TBAG-223, 63 pp.
- ¹⁸⁷KOCATAŞ, A. & KATAGAN, T., 1994. Türkiye Denizleri, Biyolojik Çeşitliğinde Lesepsiyen (Süveyş Kanalı) Decapod ve Stomatopad Türlerinin Etkisi. p. 290-294. In: *XII Biyoloji Kongresi, 6-8 Temmuz 1994*, Edirne.
- ¹⁸⁸KOCATAŞ, A. & KATAGAN, T., 2003. Decapod crustacean fauna of the Turkish seas. *Zoology in the Middle East*, 29: 63-74.
- ¹⁸⁹KOÇAK, F., 2007. A new alien bryozoan *Celleporaria brunnea* (Hincks, 1884) in the Aegean Sea (eastern Mediterranean). *Scientia Marina*, 71 (1): 191-195.
- ¹⁹⁰KOÇAK, F., ERGEN, Z. & ÇINAR, M.E., 1999. Fouling organisms and their developments in a polluted and an unpolluted marina in the Aegean Sea (Turkey). *Ophelia*, 50: 1-20.
- ¹⁹¹KOSSWIG, C., 1950. Erythraische fische im Mittelmeer und an der grenze der Agais. *Syllogomena Biologica, Festschrift Kleinschmidt*, 203-212.
- ¹⁹²KOSSWIG, C., 1951. Contributions to the knowledge of the zoogeographical situation in the near and Middle East. *Experientia*, 7: 401-440.
- ¹⁹³KOSSWIG, C., 1956. Facts and problems offered by the erythrean invaders into the Mediterranean. *Balık ve Balıkçılık*, 4: 31-37.
- KOUKOUSIOURA, O., DIMIZA, M.D. & TRIANTAPHYLLOU, M.V., 2010. Alien foraminifers from Greek coastal areas (Aegean Sea, Eastern Mediterranean). *Mediterranean Marine Science*, 11 (1): 155-172.

- ¹⁹⁴KUMLU, M., EROLDOĞAN, O.T., AKTAŞ, M. & GÖÇER, M., 2002. A new shrimp record for the Turkish seas: *Melicertus hathor* (Burkenroad, 1959) (Penaeidae: Crustacea). *Israel Journal of Zoology*, 48: 246-247.
- ¹⁹⁵KURT ŞAHİN, G. & ÇINAR, M.E., 2009a. Eunicidae (Polychaeta) species in and around İskenderun Bay (Levantine Sea, Eastern Mediterranean) with a new alien species for the Mediterranean Sea and a re-description of *Lysidice collaris*. *Turkish Journal of Zoology*, 33: 331-347.
- ¹⁹⁶KURT ŞAHİN, G. & ÇINAR, M.E., 2009b. Presence of *Marphysa disjuncta* (Polychaeta: Eunicidae) in the Mediterranean Sea. *Mediterranean Marine Science*, 10 (2): 145-150.
- LANGER, M.R. & HOTTINGER, L., 2000. Biogeography of selected "larger" foraminifera. *Micropaleontology*, 46 (Suppl. 1): 105-126.
- ¹⁹⁷LINDNER, G., 1987. Interessante Schneckenfunde an der Südtürkischen Mittelmeerküste (Reisemitbringsel der Familie SCHMIDT, Feldkirchen). *Club Conchylia Information*, 19: 32-43.
- ¹⁹⁸MATER, S. & BILECENOĞLU, M., 1999. Türkiye deniz balıkları. p. 790-808. In: *Genel Zoocoğrafya ve Türkiye Zoocoğrafyası*, A. Demirsoy (Ed), Meteksan Matbaası, Ankara.
- ¹⁹⁹MATER, S. & KAYA, M., 1987. Türkiye'nin Akdeniz sularında yeni kaydedilen üç balık türü, *Sudis hyalina* Rafinesque, *Pelates quadrilineatus* (Bloch), *Apogon nigripinnis* Cuvier (Teleostei) hakkında. *Doga, Türk Zooloji Dergisi*, 11: 45-49.
- ²⁰⁰MAVILI, S. & SEVER, T.M., 2002. Distribution of *Acartia grani* Sars, 1904 (Copepoda, Crustacea) in Izmir Bay (Aegean Sea). *Ege University Journal of Fisheries & Aquatic Sciences*, 19: 473-477.
- ²⁰¹MERİÇ, E. & AVŞAR, N., 2001. Benthic foraminiferal fauna of Gökçeada Island (Northern Aegean Sea) and its local variations. *Acta Adriatica*, 42: 125-149.
- ²⁰²MERİÇ, E., AVŞAR, N. & BERGIN, F., 2004a. Benthic foraminifera of Eastern Aegean Sea (Turkey) systematics and autoecology. *Chamber of Geological Engineers of Turkey and Turkish Marine Research Foundation*, 18: 306.
- ²⁰³MERİÇ, E., AVŞAR, N. & YOKEŞ, M.B., 2008a. Some alien foraminifers along the Aegean and southwestern coasts of Turkey. *Micropaleontology*, 54: 307-349.
- ²¹⁰MERİÇ, E., AVŞAR, N., NAZİK, A., ALPAR, B., YOKEŞ, M.B., BARUT, I.F. & UNLU, S., 2005. Gemlik Körfezi yüzey çökellerinin foraminifer, ostrakod ve mollusk faunası, foraminifer kavkılarında gözlenen morfolojik anomaliler ile bölgenin sedimentolojik, hidrokimyasal ve biyokimyasal özellikleri. *Maden Tetkik ve Arama Dergisi*, 131: 21-48.
- ²⁰⁹MERİÇ, E., AVŞAR, N., NAZİK, A., ERYILMAZ, M. & YÜCESOY-ERYILMAZ, F., 2004b. Saros Körfezi'nin (Kuzey Ege Denizi) güncel bentik ve planktik foraminifer toplulukları ile çökel dağılımı. *Çukurova Üniversitesi Yerbilimleri (Geosound)*, 44: 1-44.
- ²¹¹MERİÇ, E., AVŞAR, N., NAZİK, A., YOKEŞ, B., ERGİN, M. et al., 2009. Çanakkale Boğazı'nın Güncel Bentik Foraminifer, Ostrakod, Mollusk Topluluğunu Denetleyen Faktörler ile Çökel Dağılımının Jeokimyası. *Türkiye Jeoloji Bülteni*, 52: 155-215.
- ²⁰⁵MERİÇ, E., AVŞAR, N., YOKEŞ,

- M.B. & DİNÇER, F., 2008b. Alibey ve Maden adaları (Ayvalık-Balıkesir) yakın çevresi bentik foraminiferlerinin taksonomik dağılımı. *Maden Tetkik ve Arama Dergisi*, 137: 49-65.
- ²⁰⁴MERİÇ, E., YOKEŞ, B. & AVŞAR, N., 2011. A new guest in Ilıca Bay (Çeşme-Izmir-Turkey), *Coscinospira acicularis* (Batsch). *Marine Biodiversity Records* (in press)
- ²⁰⁶MERİÇ, E., YOKEŞ, M.B., AVŞAR, N. & BİRCAN, C., 2010a. An oasis for alien benthic Foraminifera in the Aegean Sea. *Aquatic Invasions*, 5 (2): 191-195.
- ²⁰⁷MERİÇ, E., YOKEŞ, B., AVŞAR, N., & DİNÇER, F., 2010b. Ege Denizi Türkiye Kıyıları Bentik Foraminifer Topluluğunda Gözlenen Yeni Göçmenler (2008–2010). p. 76-87. In: *14. Sualtı Bilim ve Teknoloji Toplantısı, Bildiriler Kitabı, 6-7 Kasım 2010, Antalya*.
- ²⁰⁸MERİÇ, E., YOKEŞ, B., AVŞAR, N. & DİNÇER, F., 2010c. Indo-Pasifik kökenli Göçmen Foraminiferler Karadeniz'e Ulaşıyorlar mı? p. 149-151. In: *45. Yıl Jeoloji Sempozyumu, Bildiri Özleri Kitabı, 13-16 Ekim 2010, Trabzon*.
- ²¹²MICALI, P. & PALAZZI, S., 1992. Contributo Alla Conoscenza Dei Pyramidellidae Della Turchia, Con Segnalazione di Due Nuove Immigrazioni Dal Mar Rosso. *Bollettino Malacologico*, 28 (1-4): 83-90.
- ²¹³MIENIS, H.K., 2004. New data concerning the presence of lessepsian and indopacific migrants among the molluscs in the Mediterranean Sea with emphasize on the situation in Israel. p. 117-131. In: *1st National Malacology Congress*, B. Öztürk & A. Salman (Eds), Turkish Marine Research Foundation Press, Izmir.
- ²¹⁴MIFSUD, C. & OVALIS, P., 2007. *Chama aspersa* Reeve, 1846 (Bivalvia: Chamidae) another established Lessepsian invader in the Mediterranean Sea. *Novapex*, 8: 27-28.
- MONCHARMONT ZEI, M., 1968. I foraminiferi di alcuni campioni di fondo prelevati lungo la costa di Beirut (Libano). *Bollettino della Società dei Naturalisti in Napoli*, 77: 3-34.
- ²¹⁵MONOD, T., 1930. Über einige indo-pazifischer Decapoden der Meeresfauna Syriens. *Zoologischer Anzeiger*, 92 (5-6): 135-141.
- ²¹⁶MUTLU, E. & ERGEV, M.B., 2008. Spatio-temporal distribution of soft-bottom epibenthic fauna on the Cilician shelf (Turkey), Mediterranean Sea. *Revista de Biología Tropical*, 56 (4): 1919-1946.
- ²¹⁷MUTLU, E., BINGEL, F., GÜCÜ, A.C., MELNIKOV, V.V., NIERMANN, U. *et al.*, 1994. Distribution of new invader *Mnemiopsis* sp. and the resident *Aurelia aurita* and *Pleurobranchia pileus* populations in the Black Sea in the years 1991–1993. *ICES Journal of Marine Science*, 51: 407-421.
- NETWIG, W., 2007. Pathway in animal invasions. p. 11-27. In: *Biological Invasions*, Nentwig, W. (Ed). Ecological Studies 193, Springer-Verlag Berlin Heidelberg.
- ²¹⁸NEU, W., 1939. Bemerkungen über einige Balanomorphe Cirripeden der Istanbuler Gewässer. *Zoologischer Anzeiger*, 125 (9/10): 209-219.
- ²¹⁹NICOLAY, K. & ROMAGNANO, E., 1983. *Strombus (Conomurex) decorus raybaudii* n. ssp. *La Conchiglia*, 174: 20-21.
- ²²⁰NIEDERHÖFER, H., ENZENROSS,

- L. & ENZENROSS, R., 1991. Neue Erkenntnisse über die Ausbreitung von "Lesseps'schen Einwanderern" (Mollusca) an der Türkischen Mittelmeerküste. *Club Conchylia Informationen*, 13: 94-108.
- ²²¹OBERLING, J.J., 1969–1971. On the Littoral Mollusca of the Sea of Marmara. *Jahrbuch des Naturhistorischen Museum*, 4: 183-218.
- ²²²OĞRETMEN, F., YILMAZ, F. & TORCU KOÇ, H., 2005. An investigation of fishes of Gökova Bay (southern Aegean Sea). *BAÜ Fen Bilimleri Enstitüsü Dergisi*, 7: 19-36.
- ²²³OKUDAN, E.Ş. & AYSEL, V., 2005. Marine algae and seagrass of Antalya (Mediterranean, Turkey), *Journal of the Black Sea/Mediterranean Environment*, 11: 303-325.
- ²²⁴OKUDAN, E.Ş. AYSEL, V., ERDUĞAN, H., DURAL-TARAKÇI, B. & AYSEL, F., 2003. Aydın (Ege Denizi, Türkiye) Deniz Algleri Ve Deniz Çayırları, *Sualtı Bilim ve Teknolojisi Toplantısı SBT 2003*, 41–49, Bursa, Uludağ Üniversitesi.
- ²²⁵OKUŞ, E., SUR, H.I., YÜKSEK, A., YILMAZ, I.N., ASLAN-YILMAZ, A., KARHAN, S.U., OZ, M.I., DEMIREL, N., TAS, S., ALTIOK, A., MÜFTÜOĞLU, A.E., GAZIOĞLU, C. & YÜCEL, Z.Y., 2004. Datca-Bozburun Özel Çevre Koruma Bölgesinin Denizsel ve Kıyusal Alanlarının Biyolojik Çesitliliğinin Tespiti Projesi. *T.C. Çevre ve Orman Bakanlığı Özel Çevre Koruma Kurumu Başkanlığı*, Ankara. 698 pp.
- ²²⁶OKUŞ, E., YÜKSEK, A., YILMAZ, I. N., ASLAN-YILMAZ, A., KARHAN, S.U. et al., 2006. Gökova Özel Çevre Koruma Bölgesinin Kıyı ve Deniz Alanlarının Biyolojik Çesitliliğinin Tespiti Projesi. *T.C. Çevre ve Orman Bakanlığı Özel Çevre Koruma Kurumu Başkanlığı*, Ankara. 504 pp.
- ²²⁷OSTROUMOFF, A., 1896. Compates rendus des dragages et du plancton de l'expédition de "Selianik", *Bulletin de Su'Académie Impériale Des Sciences Saint Petersburg*, 5: 33-92.
- ²²⁸ÖNEN, M., 1983. The qualitative and quantitative investigation of the macrobenthic fauna found in the soft substratum of the Urla Harbour. *Ege University Faculty of Science Journal*, 6: 29-39.
- ²²⁹ÖNEN, M., ERGEN, Z., KATAGAN, T. & ÇINAR, M.E., 1998. Güllük Lagünü bentik organizmalarının mevsimsel dinamiği. p. 203-226. In: *XIV Ulusal Biyoloji Kongresi*, Cilt II, Samsun.
- ²³⁰ÖZCAN, T., ATEŞ, A.S. & KATAĞAN, T., 2008a. On the presence of the snapping shrimp, *Alpheus rapacida* (Decapoda: Caridea) on the Aegean Sea coast of Turkey. *Marine Biodiversity Records*, 1 (e86): 1-2. (Published online)
- ²³¹ÖZCAN, T., ATEŞ, A.S. & KATAĞAN, T., 2008c. Expanding distribution and occurrence of the Indo-Pacific Stomatopod, *Erugosquilla massavensis* (Kossmann, 1880) on the Aegean Sea Coast of Turkey. *Mediterranean Marine Science*, 9 (2): 117-120.
- ²³⁴ÖZCAN, T., GALİL, B.S., BAKIR, A.K. & KATAGAN, T., 2006. The first record of the banana prawn *Fenneropenaeus merguensis* (De Man, 1888) (Crustacea: Decapoda: Penaeidae) from the Mediterranean Sea. *Aquatic Invasions*, 1 (4): 286-288.
- ²³²ÖZCAN, T., KATAĞAN, T. & ATEŞ, A.S., 2008b. A new record of the Lessepsian shrimp, *Ogyrides mjobergi*

- (Balss,1921) (Decapoda, Ogyrididae) from the Levantine Coast of Turkey. *Crustaceana*, 81: 755-758.
- ²³³ÖZCAN, T., KATAĞAN, T. & PETER, K.N.L.G., 2010. First record of *Eurycarcinus integrifrons* De Man 1879 (Decapoda, Pilumnidae) from the Mediterranean Sea. *Crustaceana*, 83: 507-510.
- ²³⁵ÖZGÜR, E. & ÖZTÜRK, B., 2007. Abundance of zoobenthic exotic species on rocky reefs in the southern Aegean Sea. *Rapport de la Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée*, 38: 565.
- ÖZGÜR, E. & ÖZTÜRK, B., 2008. A population of the alien jellyfish, *Cassiopea andromeda* (Forsskål, 1775) [Cnidaria: Scyphozoa: Rhizostomea] in the Ölüdeniz Lagoon, Turkey. *Aquatic Invasions*, 3 (4): 423-428.
- ²³⁶ÖZTÜRK, B. & AARTSEN, J.J. Van, 2006. Indo-Pacific species in the Mediterranean. 5. *Chrysallida micronana* nom. nov. for *Chrysallida nana* (Hornung and Mermod, 1924) (Gastropoda: Pyramidellidae). *Aquatic Invasions*, 1 (4): 241-244.
- ²³⁷ÖZTÜRK, B. & CAN, A., 2006. Indo-Pacific gastropod species in the Levantine and Aegean Seas. *Aquatic Invasions*, 1 (3): 124-129.
- ÖZTÜRK, B. & İŞİNİBİLİR, M., 2010. An alien jellyfish *Rhopilema nomadica* and its impacts to the Eastern Mediterranean part of Turkey. *Journal of the Black Sea/Mediterranean Environment*, 16 (2): 149-156.
- ²³⁸ÖZTÜRK, B. & POUTIERS, J.M., 2005. *Fulvia fragilis* (Bivalvia: Cardiidae): a lessepsian mollusc species from Izmir Bay (Aegean Sea). *Journal of the Marine Biological Association of the United Kingdom*, 85: 351-356.
- ²³⁹ÖZTÜRK, B., ÖNEN, M. & DOĞAN, A., 2008. Determination Atlas of Turkish Marine Molluscs (except Cephalopoda). *Project number 103 T 154 funded by The Scientific and Technological Research Council of Turkey*, 468 pp. (in Turkish)
- ²⁴⁰ÖZTÜRK, M., 1993. Türkiye'nin Ege ve Akdeniz Kıyılarındaki *Chordariales* ve *Sporochneales* (Phaeophyta) üyelerinin yayılımı ve taksonomisi. *Turkish Journal of Botany*, 17: 237-247.
- ²⁴¹ÖZTÜRK, M. & GÜNER, H., 1986. Türkiye'nin Ege ve Akdeniz Kıyılarındaki Ectocarpales (Phaeophyta) üyelerinin yayılımı ve taksonomisi. *Turkish Journal of Botany*, 10: 459-472.
- ²⁴²ØKSNEBJERG, B., ENZENROSS, R. & ENZENROSS, L., 1997. First record of Rhizocephala (Crustacea: Cirripedia) from Turkish waters, with notes on Lessepsian migration. *Stuttgarter Beiträge zur Naturkunde, Serie A* (Biologie), 55: 1-7.
- ²⁴³PALAZZI, S., 1993. Ci sono due *Zafra* in mediterraneo, ma come si chiamano? *Notiziario del CISMA*, 14: 13-18.
- ²⁴⁴PINAR, E., 1974. Türkiye'nin bazı limanlarında fouling-boring organizmalar ve antifouling-antiboring boyaların bunlar üzerine etkisi. *Ege Üniversitesi Fen Fakültesi İlmî Raporlar Serisi*, 170: 1-67.
- POLAT, S., 2007. New record for a dinoflagellate species (*Gonyaulax pacifica* Kofoid) from Turkish coastal waters (northeastern Mediterranean Sea). *Turkish Journal of Botany*, 31: 67-70.
- POLAT, S. & KORAY, T., 2007. Planktonic dinoflagellates of the northern Levantine Basin, northeastern Mediterranean Sea. *European Journal of Protistology*, 43 (3): 193-204.
- POLAT, S., SARIHAN, E. & KORAY,

- T., 2000. Seasonal changes in the phytoplankton of the northeastern Mediterranean (Bay of İskenderun). *Turkish Journal of Botany*, 24: 1-12.
- POR, F.D., 2009. Tethys returns to the Mediterranean: Success and limits of tropical re-colonization. *Biorisk*, 4: 5-19.
- ²⁴⁵QUATREFAGES, M.A., 1865. *Histoire naturelle des Annélides marins et d'eau douce, Annélides et Gephyriens, 2. Sedentaira* (Paris), 562 pp.
- REISS, Z. & HOTTINGER, L., 1984. *The Gulf of Aqaba, Ecological Micropaleontology*. Ecological Studies vol. 5. Springer-Verlag, Berlin-Heidelberg, 354 pp.
- ²⁴⁶RULLIER, F., 1963. Les Annélides polychètes du Bosphore, de la Mer de Marmara et de la Mer Noire, en relation avec celles de la Méditerranée. *Extrait des Rapports et Procès-verbaux des réunions de la C.I.E.S.M.M.*, 17: 161-260.
- ²⁴⁷SALMAN, A., 2002. New report of the loliginid squid *Sepioteuthis lessoniana* Lesson, 1830 in the Mediterranean. *Israel Journal of Zoology*, 48: 249-250.
- ²⁴⁸SALMAN, A., KATAĞAN, T. & BOLETZKY, S. Von, 1999. New Cephalopod molluscs in the eastern Mediterranean: previously unnoted species or recent migrants? *Vie et Milieu*, 49: 11-17.
- SALAMEH, P., SONIN, O., GOLANI, D., 2010. First record of the burrowing goby, *Trypauchen vagina* (Actinopterygii: Gobiidae: Amblyopinae), in the Mediterranean. *Acta Ichthyologica et Piscatoria*, 40: 109-111.
- SCHEMBRI, P.J., BODILIS, P., EVANS, J. & FRANCOUR, P., 2010. Occurrence of barred knifejaw, *Oplegnathus fasciatus* (Actinopterygii: Perciformes: Oplegnathidae) in Malta (Central Mediterranean) with a discussion on possible modes of entry. *Acta Ichthyologica et Piscatoria*, 40: 101-104.
- ²⁴⁹SCHNIEBS, K., 2000. Erster Nachweis einer Stomatelliden-Art im Mittelmeer (Gastropoda: Prosobranchia). *Malakologische Abhandlungen*, 20: 99-100.
- SCHWINDT, E., BORTOLUSI, A. & IRIBARNE, O.O., 2001. Invasion of a reef-builder polychaeta: direct and indirect impacts on the native benthic community structure. *Biological Invasions*, 3 (1): 137-149.
- ²⁵⁰SEZGİN, M., BAKIR, K. & KATAĞAN, T., 2007. New record of a Lessepsian amphipod from the Levantine coast of Turkey: *Elasmopus pectenicrus* (Bate, 1862). *Crustaceana*, 80: 247-251.
- ²⁵¹STOCK, J.H., 1962. Some Turkish pycnogonid records. *Entomologische Berichten*, 22: 218-219.
- ²⁵²STÖHR, S., ÇINAR, M.E. & DAGLI, E., 2010. Brittle stars (Echinodermata: Ophiuroidea) from the southern coast of Turkey (eastern Mediterranean): new records and revision of *Amphiodia obtecta* Mortensen, 1940. *Zootaxa*, 2483: 45-57.
- ²⁵³SWENNEN, C., 1961. On a collection of Opisthobranchia from Turkey. *Zoologische Mededelingen*, 38: 41-75.
- ²⁵⁴ŞEN, S., SİVRİKAYA, H., YALÇIN, M., BAKIR, A.K. & ÖZTÜRK, B., 2010. Fouling and boring organisms that deteriorate various European and tropical woods at Turkish seas. *African Journal of Biotechnology*, 9: 2566-2573.
- ²⁵⁵TAŞKAVAK, E., BILECENOĞLU, M., BAŞUSTA, N. & MATER, S., 2000. Occurrence of *Pteragogus pelycus* Randall, 1981 (Teleostei: Labridae) and *Petroscirtes ancylodon* Rüppell, 1838 (Teleostei: Blenniidae) in Turkish

- Mediterranean waters. *Acta Adriatica*, 41: 53-58.
- ²⁵⁶TAŞKIN, E., ÖZTURK, M. & WYNNE, M.J., 2006. First report of *Microspongium globosum* Reinke (Phaeophyceae, Myrionemataceae) in the Mediterranean Sea. *Nova Hedwigia*, 82: 135-142.
- ²⁵⁷TARKAN, A.N., İŞİNİBİLİR, M. & ERK, M.H., 2001. Dominant zooplankton species in the waters of the northern Gökçeada. p. 59-70. In: *Ulusal Ege Adalari 2001 Toplantisi Bildiriler Kitabı, 10 - 13 Ağustos 2001, Gökçeada*. Turkish Marine Research Foundation, Istanbul.
- ²⁵⁸TERBIYIK, T., CEVIK, C., TOKLU-ALICLI, B. & SARIHAN, E., 2007. First record of *Ferosagitta galerita* (Dallot, 1971) [Chaetognatha] in the Mediterranean Sea. *Journal of Plankton Research*, 29 (8): 721-726.
- ²⁵⁹TOKLU, B. & SARIHAN, E., 2003. The Copepoda and Cladocera (Crustacea) fauna along the Yumurtalik-Botas coastline in Iskenderun Bay. *Ege University Journal of Fisheries and Aquatic Sciences*, 20: 63-68.
- ²⁶⁰TORTONESE, E., 1947. Ricerche zoologiche nell'isola di Rodi (Mar Egeo) Pesci. *Bolletino di Pesca, Piscicoltura e Idrobiologia*, 23: 143-192.
- ²⁶¹TRINGALI, L., 1994. Levant Sea: A new lessepsian host of the genus *Sticteulima* F.C. Laseron, 1955. *La Conchiglia*, 273: 57-58.
- ²⁶²TRINGALI, L. & VILLA, R., 1990. Rinvenimenti malacologici dalle coste Turche (Gastropoda, Polyplacophora, Bivalvia). *Notiziario del CISMA*, 11: 33-41.
- ²⁶³TUNCER, S., ASLAN CIHANGIR, H. & BILECENOĞLU, M. 2008. First record of the Lessepsian migrant *Lagocephalus spadiceus* (Tetraodontidae) in the Sea of Marmara. *Cybium*, 32: 347-348.
- ²⁶⁴TURAN, C. & YAGLIOĞLU, D., 2011. First record of the Spiny blaasop *Tylerius spinosissimus* (Regan, 1908) (Tetraodontidae) from the Turkish coasts. *Mediterranean Marine Science*, in press.
- ²⁶⁵TURAN, C., YAGLIOĞLU, D., ERGUDEN, D., GURLEK, M. & SONMEZ, B. 2010. First record of the broad-banded cardinal fish *Apogon fasciatus* (White, 1790) from Turkey. *Mediterranean Marine Science*, 11 (1): 369-372.
- ²⁶⁶TURNA, I., CORMACI, M. & FURNARI, G., 2000. First Record of *Botryocladia madagascariensis* G. Feldmann (*Rhodymeniaceae, Rhodophyceae*) from the Gulf of Antalya (Mediterranean coast of Turkey). *Plant Biosystems*, 134: 111-115.
- ²⁶⁷TÜRKMEN, A. & DEMİRSOY, A., 2009. Contributions to the Eastern Mediterranean Opisthobranchia (Mollusca: Gastropoda) fauna of Turkey. *Turkish Journal of Zoology*, 33: 57-68.
- ²⁶⁸UYSAL, Z. & MUTLU, E., 1993. Preliminary note on the occurrence and biometry of Ctenophoran *Mnemiopsis leidyi* finally invaded Mersin Bay. *Doga, Turkish Journal of Zoology*, 12: 229-236.
- ²⁶⁹UYSAL, Z., KIDEYS, A.E., SHMELEVA, A.A., ZAGORODNYAYA, J.A. & GUBANOVA, A.D. 2002. Checklist of copepods (Calonida and Podoplea) from the northern Levantine basin shelf waters. *Hydrobiologia*, 482: 15-21.
- ²⁷⁰ÜNAL, E., SHMELEVA, A.A., ZAGORODNYAYA, J. & KIDEYS, A.E.,

2000. Zooplankton structure and copepod species of the Sea of Marmara in spring 1998. p. 450-460. In: *Proceedings book of symposium on Marmara Sea 2000*, B. Öztürk, M. Kadiroglu & H. Öztürk (Eds). TUDAV, Istanbul.
- ²⁷¹ÜNSAL, I. & d'HONDT, J.L., 1979. Contribution à la connaissance des bryozoaires marins de Turquie (Eurytomata et Cyclostomata). *Vie Milieu*, 28-29 (4): 613-634.
- ²⁷²ÜNSAL, S., 1992. Türkiye denizleri için yeni bir kefal balığı türü: *Mugil so-iuy* Basilewsky. *Turkish Journal of Veterinary & Animal Sciences*, 16: 427-432.
- ²⁷³VERLAQUE, M. & BOUDOU-RESQUE, C.F., 1991. *Styopodium schimperi* (Buchinger ex Kützing) Verlaque et Boudouresque comb.nov. (Dictyotales, Fucophyceae), algue de Mer Rouge récemment apparue en Méditerranée. *Cryptogamie, Algologie*, 12: 195-211.
- ²⁷⁴WHITEHEAD, P.J.P., 1984. Clupeidae. p. 268-281. In: *Fishes of the North-eastern Atlantic and the Mediterranean*, P.J.P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen & E. Tortonese, (Eds) UNESCO, Paris.
- YARMAZ, A., BALABAN, C., TÜRKAKIN, M. & TÜRKER-ÇAKIR, D., 2010. A new record of Lessepsian migrant *Etrumeus teres* (DeKay, 1842) (Osteichthyes: Clupeidae) from the northern Aegean Sea. *Journal of Applied Ichthyology*, 26: 134-136.
- ²⁷⁵YILMAZ, R., BILECENOĞLU, M. & HOŞSUCU, B., 2004. First record of the antenna codlet, *Bregmaceros atlanticus* Goode & Bean, 1886 (Osteichthyes: Bregmacerotidae) from the eastern Mediterranean Sea. *Zoology in the Middle East*, 31: 111-112.
- ²⁷⁶YOKEŞ, M.B. & GALİL, B.S., 2004. New records of alien decapods from the southwestern coast of Turkey. *Rapport de la Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée*, 37: 556.
- ²⁷⁷YOKEŞ, M.B. & GALİL, B.S., 2006a. The first record of the needle-spined urchin *Diadema setosum* (Leske, 1778) (Echinodermata: Echinoidea: Diadematidae) from the Mediterranean Sea. *Aquatic Invasions*, 1 (3): 188-190.
- ²⁷⁸YOKEŞ, M.B. & GALİL, B.S., 2006b. Touchdown-first record of *Percnon gibbesi* (H. Milne Edwards, 1853) (Crustacea: Decapoda: Grapsidae) from the Levantine coast. *Aquatic Invasions*, 1 (3): 130-132.
- ²⁷⁹YOKEŞ, M.B., GALİL, B.S., 2006c. New records of alien decapods (Crustacea) from the Mediterranean coast of Turkey, with a description of a new palaemonid species. *Zoosystema*, 28: 747-755.
- YOKEŞ, M.B. & MERİÇ, E., 2004. Expanded populations of *Amphistegina lobifera* from the southwestern coast of Turkey. p. 232-233. In: *Fourth International Congress Environmental Micropaleontology, Microbiology & Meiobenthology*.
- ²⁸⁰YOKEŞ, M.B. & RUDMAN, W.B., 2004. Lessepsian opisthobranchs from southwestern coast of Turkey; five new records for Mediterranean. *Rapport de la Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée*, 37: 557.
- YOKEŞ, M.B., BİLECENOĞLU, M., GOREN, M., GALİL, B.S. & DIAMANT, A., 2009. Genetic evidence for wide distribution of the alien prawn-goby, *Vanderhorstia mertensi* (Actinopterygii: Perciformes: Gobiidae), along the northeast Mediter-

- anean. *Acta Ichthyologica et Piscatoria*, 39: 153-156.
- ²⁸¹YOKEŞ, M.B., KARHAN, S.U., OKUŞ, E., YUKSEK, A., ASLAN-YILMAZ, A. *et al.*, 2007b. Alien Crustacean Decapods from the Aegean Coast of Turkey. *Aquatic Invasions*, 2 (3): 162-168.
- YOKEŞ, M.B., MERICİ, E. & AVŞAR, N., 2007a. On the presence of alien Foraminifera *Amphistegina lobifera* Larsen on the coasts of Maltese Islands. *Aquatic Invasions*, 2 (4): 439-441.
- ²⁸²YOKOYAMA, H., DAĞLI, E. & ÇINAR, M.E., 2010. First record of *Paraprionospio coora* Wilson, 1990 (Polychaeta: Spionidae) from the Mediterranean Sea. *Mediterranean Marine Science*, 11 (1): 133-141.
- ²⁸³ZAITSEV, Y. & ÖZTÜRK, B., 2001. *Exotic species in the Aegean, Marmara, Black, Azov and Caspian Seas*. Turkish Marine Research Foundation, Istanbul, 267 pp.
- ZENETOS, A., GOFAS, S., VERLAQUE, M., ÇINAR, M.E., GARCIA RASO, E. *et al.*, 2010b. Alien species in the Mediterranean Sea by 2010. A contribution to the application of European Union's Marine Strategy Framework Directive (MSFD). Part I. Spatial distribution. *Mediterranean Marine Science*, 11 (1): 381-493.
- ZENETOS, A., MERICİ, E., VERLAQUE, M., GALLI, P., BOUDOURESQUE, C.F. *et al.*, 2008. Additions to the annotated list of marine alien biota in the Mediterranean with special emphasis on Foraminifera and Parasites. *Mediterranean Marine Science*, 9 (1): 119-165.
- ²⁸⁴ZENETOS, A., OVALIS, P. & ÇEVİKER, D., 2010a. On some Indo-Pacific boring endolithic Bivalvia species introduced into the Mediterranean Sea with their host-spread of *Sphenia rueppelli* A. Adams, 1850. *Mediterranean Marine Science*, 11 (1): 201-207.
- ²⁸⁵ZEYBEK, N., 1969. Türkiye'nin Akdeniz algleri 1. Bodrum-Finike Körfezi sahil boyu. 2. Ege Denizi-Edremit Saros Körfezi-Sile. *TBAG-124 nolu proje*.
- ²⁸⁶ZEYBEK, N., 1973a. Meeresalgen aus der Türkei. 1. Die Buchten von Edremit und Saros am Aegaeischen meer, 2. Die küste von Igneada bis Sile am Schwarzen meer. *Verhandl der Schweizerischen naturforschenden Gesellschaft*, 95-100.
- ²⁸⁷ZEYBEK, N., 1973b. Türkiye'nin deniz algleri. *IV Biyoloji Kongresi*, Ankara, 214: 1-3.
- ²⁸⁸ZEYBEK, N. & GÜNER, H., 1973. Çanakkale Bogazı ve Bozcaada deniz algleri. *Ege Üniversitesi Fen Fakültesi İlmi Raporlar Serisi*, 145: 1-19.
- ²⁸⁹ZEYBEK, N., GÜNER, H. & AYSEL, V., 1986. The marine algae of Türkiye. p. 169-197. In: *Proceedings of the 5th OPTIMA Meeting, 8-15 September, Istanbul*.
- ²⁹⁰ZIBROWIUS, H., 1993. Records of *Halophila stipulacea* from "Calypso" cruises in Greek and Turkish waters, 1955-1977. *Posidonia Newsletter*, 4: 7-10.