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Inventory and the biogeographical affinities of Annelida Polychaeta in the Algerian coastline (Western Mediterranean)

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Abstract

From collected data analyzed to produce an inventory of all polychaetes in Algerian waters, the diversity of this group was estimated as 534 species. The largest families are Syllidae (66 species), Spionidae (37 species) and Terebellidae (27 species). The presence of those listed species along the Algerian coast was compared with their occurrence in nine other areas of the Mediterranean Sea, in the Black Sea and in four other more distant seas around the world. Comparisons are also made with respect to the biogeographical origin for each species. The polychaete fauna of the Algerian coast is among the richest of the Mediterranean Sea and comparable to the diversity reported for the French Mediterranean continental shelf and that in the Aegean Sea, but higher than that found in the nearby coastlines of Morocco and Tunisia. Most of the species found have an Atlantic origin and are present in the western Mediterranean Sea. This current inventory includes eight non-indigenous polychaete species found in the Algerian waters.

Keywords: Biogeography; inventory; non-native species; benthos.

Introduction

Establishing an inventory of marine species remains a challenging task despite the availability of numerous records (especially via the Internet), and the existing data already provided by taxonomists and ecologists. Coll *et al.* (2010) carried out the first complete inventory of marine species in the Mediterranean Sea at the end of the 2010s.

The entire Mediterranean region, with its smaller distinct areas, has long been recognized as rich in terms of marine biodiversity (Coll *et al.*, 2010, 2012; Altobelli *et al.*, 2017). In their review for the Mediterranean Sea, Coll *et al.* (2010) reported 16,848 different marine species, including 10,902 invertebrates. Moreover, these authors stressed that these numbers were probably still an underestimate and needed to be supplemented to include additional species found in some southern areas of the sea as well as those living in the deeper regions of the eastern basin. This gap in their records mostly concerns the coasts of North Africa, mainly relating to Libya and Algeria. Such an apparent lack of available information is probably due to the numerous data included in early

publications written in French and the large amount of grey literature including PhD theses that are often not accessible via the web.

The annelid polychaetes are amongst the most diversified of invertebrates and several publications report inventories for this group at the local, national and regional scale, including the coastlines along Morocco and Tunisia in the southern part of the western basin of the Mediterranean Sea.

Some inventories for polychaetes cover the entire Mediterranean Sea (Arvanitidis *et al.*, 2002; Castelli *et al.*, 2008; Coll *et al.*, 2010), while others are limited to certain areas: Moroccan waters (both the Atlantic and Mediterranean coasts) (Gillet, 2017), the Mediterranean coast of France (Laubier & Paris, 1962; Dauvin *et al.*, 2006), Italian waters (Castelli *et al.*, 1995, 2008), the Adriatic Sea (Musco, 2012; Mikac, 2015), the Tunisian coasts (Ayari *et al.*, 2009; Zaâbi *et al.*, 2012, Mosbahi *et al.*, 2017), the Aegean Sea (Ergen, 1976; Simbora & Nicolaidou, 1994, 2001; Arvanitidis, 2000; Ergen *et al.*, 2002, 2006; Faulwetter *et al.*, 2017), the Levantine Sea (Laubier, 1966; Ben-Eliahu, 1995; Çinar & Ergen, 2003; Çinar, 2005, 2007, 2009; Çinar *et al.*, 2003, 2014;

Mutlu *et al.*, 2010; Faulwetter *et al.*, 2017; Dorgham *et al.*, 2013, 2014), the Turkish coastline (Çinar *et al.*, 2014) and the Black Sea (Arvaniditis *et al.*, 2002; Şahin & Çinar, 2012). However, no complete inventory is available for the 1200km of Algerian coastline. The first studies of polychaetes in Algerian waters took place at the turn of the 20th century. Viguier (1886 to 1920) and Gravier & Dantan (1928) described several new species of polychaetes in the Bay of Algiers, including the genus *Alciope* Viguier, 1886, the genus *Frennia* Viguier, 1912 (*F. dubia* Viguier, 1912, *F. propinqua* Viguier, 1920), the genus *Iospilus* Viguier, 1886 (*I. phalacroides* Viguier, 1886), the genus *Maupasias* Viguier, 1886 (*M. coeca* Viguier, 1886), the genus *Paraioispilus* Viguier, 1911 (*P. affinis* Viguier, 1911), and the species *Nereis icosiensis* Gravier & Dantan, 1928. Most of the polychaetes found during this period were reported by Fauvel (1923, 1927a, 1927b) in the French publication 'Faune de France, polychètes errantes et sédentaires'. Fauvel (1927b) wrote:

'A l'exception des Mémoires de Viguier sur le plancton de la Baie d'Alger et de quelques mentions par Marenzeller (1888) on ne trouve que de bien rares indications disséminées dans d'autres travaux. Jamais à notre connaissance la Faune des Polychètes des Côtes d'Algérie n'a encore été l'objet de recherches suivies et cela est regrettable car cette étude fournirait sûrement bien des observations intéressantes' translated as 'Other than the memoirs of Viguier on the plankton in the Bay of Algiers and some references by Marenzeller (1888), it is very rare to find anything disseminated in other studies. To the best of our knowledge, polychaete fauna off the coast of Algeria has never been the subject of research, which is regrettable, as such a study would surely provide some interesting observations'.

Marcel (1962) studied the annual cycle of *Perinereis cultrifera*. In studies on the phanerogam meadows on the Algerian coastline near Bou Ismail, Le Gall (1969) identified 72 polychaetes species, whereas Falconetti (1970) listed 64 polychaete species from the maërl beds in the same bay. Separately, some data was acquired for the waters in the harbour of Algiers (Bakalem & Romano, 1983, 1988; Rebzani-Zahaf *et al.*, 1988; Rebzani-Zahaf, 1990, 1992). Populations of some nereids in shallow hard substrates from the eastern part of the Algerian coast were investigated by Rouabah & Scaps (2003) and also by Daas *et al.* (2010). In other work, Younsi *et al.* (2010) recorded the polychaetes of economic interest and Meghlaoui *et al.* (2015a,b) investigated the effects of local pollution on polychaetes. More recently Bakalem (2008) and Grimes (2010) studied the communities of soft bottom of all Algerian gulfs, bays and harbours, in reported work that includes inventories of polychaetes.

Despite this level of scientific interest, there has still been no complete inventory of all polychaetes found in Algerian waters. A total of 26 polychaete species were initially listed in the two monographs entitled 'Faune de France' (Fauvel, 1923, 1927a), whilst a further 69 species were later added by Gravier & Dantan (1928). Many further species have since been identified during the PhD research of Bakalem (2008) (444 species) and then by Grimes (2010) (506 species). All these previous documents from an essential basis for the current listing of polychaetes of the Algerian coast; other even more recent publications, (including as yet unpublished data and personal communications), have been used to supplement the complete inventory reported here.

The main objectives of this current study were:

- to present a current list of all polychaetes species

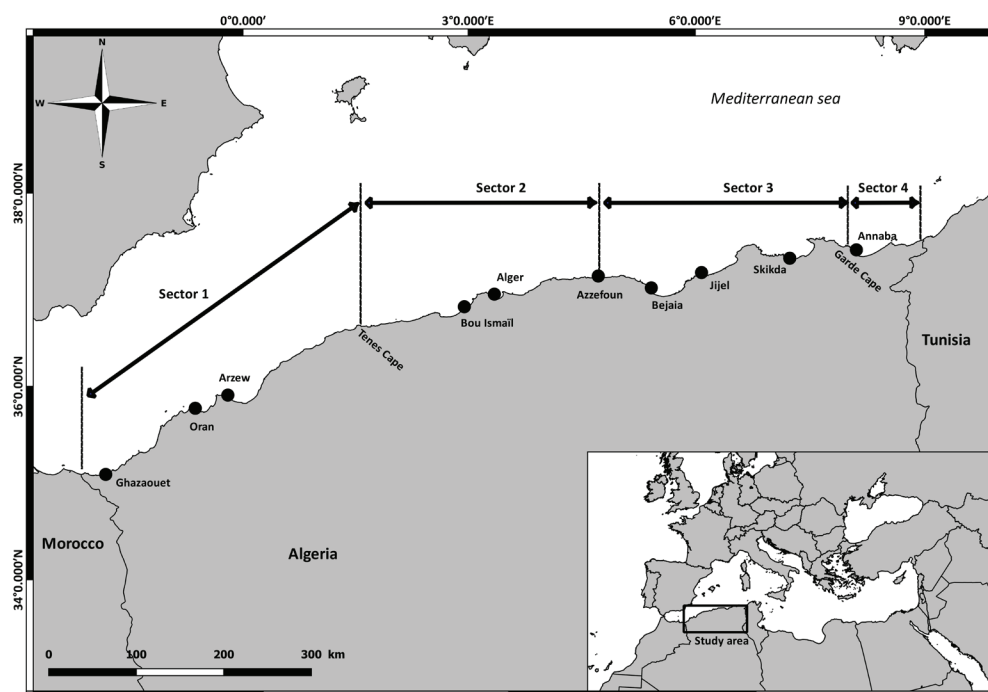


Fig. 1: Map of the Algerian coast with identification of the four study sectors with cited locations.

- recorded along the whole Algerian coastline;
- to attribute geographical affinities for each of the Algerian polychaete species;
- to compare the inventory of polychaete in the coastal waters off Algeria with similar studies compiled for other areas of the Mediterranean Sea.

Materials and Methods

General characteristics of the Algerian coastal zone

The Algerian coastline (Fig. 1) covers a variety of different habitats, ranging from rocky shorelines (sometimes with high cliffs), to sandy beaches and dunes found in many of the bays. The Algerian continental shelf is narrow, in contrast with those found in the north-western basin of the Mediterranean Sea, and especially the Gulf of Lion and the northern part of the Adriatic Sea. The distribution of soft sediments shows an increasing gradient (in terms of silt content) with sea depth; the seabed composition was characterized by a succession of fine sand, muddy sand, sandy mud and pure mud such as observed in the coastal seabed in the bay of Algiers and the bay of Bou Ismail (Bakalem, 2008; Bakalem *et al.*, 2020). Coarse sand and gravel make up the seabed near rocky shores, especially in the vicinity of the headlands bordering the bays (Grimes *et al.*, 2016). The shallow waters are also characterized by some specific habitats such as “seagrass zones” including *Posidonia oceanica* meadows and coralligenous formations both types having a high natural heritage value. The composition of the fauna in these habitats is characterized by a high diversity, and such areas are protected in many countries bordering the Mediterranean Sea against a range of environmental threats (Coll *et al.*, 2010, 2012; Altobelli *et al.*, 2017).

The circulation of the sea currents along the Algerian coast is mainly influenced by North Atlantic surface waters, which penetrate into the Mediterranean Sea through the Strait of Gibraltar. As they continue to progress eastward, the Atlantic waters gradually mix into the Mediterranean waters with its higher salinity. This movement is highlighted by the progressive impoverishment of Atlantic species travelling from the western to the eastern part of the Algerian coast (Dauvin *et al.*, 2013).

Data sources

The current study covers all the polychaetes that have been recorded along the Algerian coast, which runs 1200km from the Morocco to Tunisia. The study has been largely restricted to the continental shelf since there was little opportunity to access the continental slope or the offshore bathyal zones (Fig. 1). Zooplankton sampling in Algiers Bay (sector 2 in Fig. 1) enabled the collection of pelagic polychaetes and the subsequent description of several new species (Viguier, 1886, 1911, 1912, 1920; Gravier & Dantan, 1928). More recent studies have fo-

cused mainly on the soft-bottom communities found in the bays and gulfs of the Algerian continental shelf (Vaisière & Fredj, 1963; Le Gall, 1969; Falconetti, 1970; Bakalem, 2008; Grimes, 2010).

These results show a progressive change in the physico-chemical marine water characteristics along the the Algerian coast from the entrance of the Atlantic current in the West and its attenuation moving to the eastern part of the coast. Since the end of the 1970, the studies of Bakalem (2008), Grimes (2010) and Dauvin *et al.* (2013) on the soft-bottom macrobenthic communities of the Algerian shallow habitats from west to east have enabled the identification of four main sectors along the coast (see Dauvin *et al.*, 2013). This classification takes into account numerous characteristics based on: 1) the hydrology and local marine currents (Furnestin & Allain, 1962a,b,c; Benzohra & Millot, 1990; Millot, 1987, 1988; Millot *et al.*, 1990), 2) the hydrology, nutrients and phytoplankton (Bernard, 1952, 1956, 1958), and 3) biological data including ichthyology and macrobenthos (Le Danois, 1925; Maurin, 1962; Vaisière & Fredj, 1963; Bakalem, 2008; Grimes, 2010).

Sector 1 is located in the West before the Almeria-Oran front with hydrological characteristics similar than those of the Atlantic waters (Fig. 1). Sectors 3 and 4 correspond to Mediterranean hydrological water characteristics while the sector 2 corresponds to an intermediate situation between the western sector 1 and the eastern sectors.

Data reported here follows the model set out by Dauvin *et al.* (2013), where the presence of polychaetes is reported for the four sectors, which enables the identification of changes in diversity along the Algerian coast from west to east. Sector 1 comprises the western part of the Algerian coast from the Moroccan border to Cap Tenes, including the bays of Ghazaouet, Oran and Arzew. Sector 2 is the central part of the coastline from Cap Tenes to Azeffoun, including the bays of Bou Ismail and Algiers. Sector 3 is defined as the eastern part of Algerian coast from Azeffoun to the Cap de Garde including the Bejaia, Jijel and Skikda bays. Finally, Sector 4 corresponds to the most eastern Algerian coast from Cap de Garde to the Tunisian border, including the bays of Annaba and El Kala (Fig. 1). The coastlines of Sectors 1 and 2 are similar in length (300-350 km), whilst the coastline of Sector 3 is longer (400 km) and that of Sector 4 shorter (150 km).

Nomenclature and polychaete classification

The nomenclature and classification of polychaetes have been the subject of several successive studies (Fauchald & Rouse, 1997; Rouse & Fauchald, 1997; Hansson, 1998; Rouse & Gonzalo, 2016; Weigert & Bleidorn, 2016). The present work adopts the most recent form of the classification system for families based on polychaete phylogeny (Weigert & Bleidorn, 2016).

The individual species were classified by family, and these are listed alphabetically in Table 1. The species are validated following the nomenclature and classification given by the World Register of Marine Species (WoRMS)

Table 1. List of the Polychaetes recorded along the Algerian coast. The species are classified following the alphabetical order of the families. Year of collection: 1886, 1911, 1912, 1920: Viguière; 1923, 1927: Fauvel; 1928, Gravier & Dantan; 1963: Vaisière & Fredj; 1969: Le Gall; 1970: Falconetti; 2008: Bakalem; 2010: Grimes. S1: Sector 1... Status: Qs: Questionable species; Sc: species complex; NIS: Non-Indigenous Species. G: geographical origin, for legend see Figure 5; 1, 2... geographical areas, for legend see Figure 6.

		Year																						
	Species	Authority	Of re- cord	Status	G	S1	S2	S3	S4	1	2	3	4	5	6	7	8	9	10	11	12	13		
Acoetidae	<i>Eupanthalis kinbergi</i>	McIntosh, 1876			eamr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Panthalis oerstedii</i>	Kinberg, 1856	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Polyodontes maxillosus</i>	(Ranzani, 1817)	2008		eamrip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Acrociiridae	<i>Acrocirrus frontifilis</i>	(Grube, 1860)	2008		eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Macrochaeta clavicornis</i>	(M. Sars, 1835)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Naiades cantraii</i>	Delle Chiaje, 1828	1886		enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Alciopidae	<i>Rhynchonereella capitata</i>	(Greeff, 1876)	1886		amip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Rhynchonereella petersii</i>	(Langerhans, 1880)	1886		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Torrea candida</i>	(Delle Chiaje, 1841)	1886		enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Yanadis longissima</i>	(Levinson, 1885)	2008		enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Ampharetidae	<i>Alkmara romijni</i>	Horst, 1919	2010	Qs	eam			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Amage adpersa</i>	(Grube, 1863)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Amage gallastii</i>	Marion, 1875	2008		am			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Ampharete grubei</i>	Malmgren, 1865	2008		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Ampharete octocirrata</i>	(Sars, 1835)	2008		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Amphicteis gunneri</i>	(M. Sars, 1835)	2008		eam			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Anobothrus gracilis</i>	(Malmgren, 1866)	2008		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Amphinomidae	<i>Melinna palmata</i>	Grube, 1870	1970		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Arenicola marina</i>	Quatrefages, 1866	2008	Qs	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Chloeta venusta</i>	(McIntosh, 1885)	1923		eam				+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Amphinomidae	<i>Hermidice carunculata</i>	Audouin & Milne Edwards, 1830	2008		eamr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Hipponoe gaudichaudi</i>	McIntosh, 1885	2008		enrip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Aphroditidae	<i>Notopogon megalops</i>	Linnaeus, 1758	2008	Qs	eamr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Aphrodita aculeata</i>	(Savigny in Lamarek, 1818)	2008		mip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Laetmonice hystrix</i>	(Baird, 1865)	1963		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Pontogenia chrysocoma</i>	(Linnaeus, 1758)	1970		eam			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Arenicolidae	<i>Arenicolides branchialis</i>	(Audouin & Milne Edwards, 1833)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Arenicolides grubii</i>	Claparède, 1868	2008		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Bonellidae	<i>Branchiomaldane vincentii</i>	Langerhans, 1881 [as vincentii]	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Maxmuelleria gigas</i>	(Müller M., 1852)	2008		em			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Capitella capitata</i>	(Fabricius, 1780)	2008	Qs&Sc	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Capitellidae	<i>Capitella giardi</i>	(Mesnil, 1897)	2010		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Capitella minima</i>	Langerhans, 1880	2008		eamrip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Dasybranchus caducus</i>	(Grube, 1846)	2008		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Dasybranchus gajolae</i>	(Eisig, 1887)	1969		em			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Heteromastus filiformis</i>	(Claparède, 1864)	2008		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Mastobranthus trinchessii</i>	(Eisig, 1887)	2008		e	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Notomastus aberans</i>	Day, 1957	2010	NIS	mrip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Capitellidae	<i>Notomastus latericus</i>	Sars, 1851	1969		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Notomastus lineatus</i>	Claparède, 1869	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Notomastus profundus</i>	(Eisig, 1887)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Peresiella clymenoides</i>	Harmelin, 1968	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
	<i>Pseudocapitella incerta</i>	Fauvel, 1913	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Capitellidae	<i>Pseudoleiocapitella fauveli</i>	Harmelin, 1964	2008		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		

Continued

Table 1 continued

Species	Authority	Year Of re- cord	Status	G	S1	S2	S3	S4	1	2	3	4	5	6	7	8	9	10	11	12	13
Chaetopte- ridae																					
<i>Chaetopterus variopedatus</i>	(Renier, 1804)	1970	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Mesochaetopterus sagittarius</i>	(Claparède, 1870)	2008	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Phyllochaetopterus gracilis</i>	Grube, 1863	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Phyllochaetopterus socialis</i>	Claparède, 1869	2008	enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Spiochaetopterus costarum</i>	(Claparède, 1869)	2008	emr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Spiochaetopterus solitarius</i>	(Rioja, 1917)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Spiochaetopterus typicus</i>	M Sars, 1856	2008	enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Chrysopete- ridae																					
<i>Chrysopetalum debile</i>	(Grube, 1855)	2008	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Aphelocheata filiformis</i>	(Kieferstein, 1862)	1927	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Aphelocheata marioni</i>	(Saint-Joseph, 1894)	1969	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Aphelocheata multibranchis</i>	(Grube, 1863)	1970	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Caulierella alata</i>	(Southern, 1914)	1969	eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Caulierella bioculata</i>	(Kieferstein, 1862)	2008	eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Chaetozone caputesocis</i>	(Saint-Joseph, 1894)	1928	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Chaetozone setosa</i>	Malmgren, 1867	1927	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Chaetozone zelandica</i>	McIntosh, 1911	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Cirratulus cirratus</i>	(O. F. Müller, 1776)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Cirratulus tentaculata</i>	(Montagu, 1808)	1969	eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Dodecaceria concharum</i>	Ørsted, 1843	1969	eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Kirkegaardia heterochaeta</i>	(Laubier, 1961)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Protocirrinis chrysoderma</i>	(Claparède, 1868)	1928	emr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Raphidrilus nemasoma</i>	Monticelli, 1910	2008	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Tharyx killariensis</i>	(Southern, 1914)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Timarete filigera</i>	(Delle Chiaje, 1828)	2010	e	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Dorvilleidae																					
<i>Dorvillea atlantica</i>	(McIntosh, 1885)	2010	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Dorvillea rubrovittata</i>	(Grube, 1855)	1928	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ophryotrocha puerilis</i>	Claparède & Meeznikow, 1869	1886	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Parophryotrocha isochaeta</i>	(Eliason, 1962)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Protodurvillea atlantica</i>	(McIntosh, 1885)	1928	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Protodurvillea kefersteini</i>	(McIntosh, 1869)	2008	eamr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Schistomeringos neglecta</i>	(Fauvel, 1923)	1969	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Schistomeringos nudolphi</i>	(Delle Chiaje, 1828)	2008	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Eunice floridana</i>	(Pourtales, 1867)	2010	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Eunice norvegica</i>	(Linnaeus, 1767)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Eunice oerstedii</i>	Stimpson, 1853	2008	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Eunice pennata</i>	(Müller, 1776)	1928	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Eunice roussaei</i>	Quatrefages, 1866	2008	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Eunice schizobranchia</i>	Claparède, 1870	2010	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Eunice vittata</i>	(Delle Chiaje, 1828)	1970	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Eunicidae																					
<i>Leodice harassii</i>	(Audouin & Milne Edwards, 1833)	1969	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Leodice torquata</i>	(Quatrefages, 1866)	2008	enrip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Lysidice ninetta</i>	Audouin & H Milne Edwards, 1833	1928	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Lysidice unicornis</i>	(Grube, 1840)	1928	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Marphysa sanguinea</i>	(Montagu, 1813)	1969	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Palola siciliensis</i>	(Grube, 1840)	1928	enrip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Paucibranchia bellii</i>	(Audouin & Milne Edwards, 1833)	2008	enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Paucibranchia fallax</i>	(Marion & Bobretsky, 1875)	1928	eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Continued

Table 1 continued

	Species	Authority	Year Of re- cord	Status	G	S1	S2	S3	S4	1	2	3	4	5	6	7	8	9	10	11	12	13
Euprosini- dae	<i>Euprosine armadillo</i>	Sars, 1851	2008		eamr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Euprosine foliosa</i>	Audouin & H Milne Edwards, 1833	1928		eamrp	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Euprosine myrtosa</i>	Savigny in Lamarek, 1818	2010	Qs	eamrp	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Fabriciidae	<i>Fabricia stellaris</i>	(Müller, 1774)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Manayunkia aestuarina</i>	(Bourne, 1883)	1969	Qs	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Pseudofabriciella filamentosa</i>	(Day, 1963)	2008		mrip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Flabellig- eridae	<i>Diplocirrus glaucus</i>	(Malmgren, 1867)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Flabelligera affinis</i>	M. Sars, 1829	1928	Sc	eamrp	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Flabelligera diplochaitus</i>	(Otto, 1820)	2010		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Pherusa monilifera</i>	(Delle Chiaje, 1841)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Pherusa plumosa</i>	(Müller, 1776)	1970	Qs	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Piromis eruca</i>	(Claparède, 1869)	1970		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Therochaeta flabellata</i>	(Sars in Sars, 1872)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Glyceridae	<i>Glyceria alba</i>	(O.F. Müller, 1776)	1969		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Glyceria capitata</i>	Örsted, 1843	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Glyceria fallax</i>	Quatrefages, 1850	1970		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Glyceria lapidum</i>	Quatrefages, 1866	1928		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Glyceria tessellata</i>	Grube, 1863	1928		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Glyceria tridactyla</i>	Schmarda, 1861	1928		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Glyceria unicomis</i>	Lamarek, 1818	2008		eamrp	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Goniadidae	<i>Glycinde nordmanni</i>	(Malmgren, 1866)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Goniada emerita</i>	Audouin & H Milne Edwards, 1833	1969		enrip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Goniada maculata</i>	Örsted, 1843	2008		eamrp	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hesionidae	<i>Goniada norvegica</i>	Örsted, 1845	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Gyptis propinqua</i>	Marion & Bobretzky, 1875	2008		eamrp	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Hesione splendida</i>	Lamarek, 1818	2008		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Leocrates clapedii</i>	(Costa in Claparède, 1868)	2008		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Nereimyra punctata</i>	(Müller, 1788)	2010	Qs	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Oxydromus agilis</i>	(Ehlers, 1864)	1928	Qs	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Oxydromus flexuosus</i>	(Delle Chiaje, 1827)	1928		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Iospilidae	<i>Oxydromus pallidus</i>	Claparède, 1864	2010		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Psamathe fusca</i>	Johnston, 1836	2008		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Syllidia armata</i>	Quatrefages, 1866	1928		eamrp	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Iospilus phalacroides</i>	Viguier, 1886	1886		am	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Paraispilus affinis</i>	Viguier, 1911	1920		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Lacydoniidae	<i>Phalacrophorus pictus</i>	Greiff, 1879	1886	Qs	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Lacydonia miranda</i>	Marion & Bobretzky, 1875	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Lopadorhynchus krohni</i>	(Claparède, 1870)	1886		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Lopador- rhynchidae	<i>Maupasia coeca</i>	Viguier, 1886	1923		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Pedinosoma curtum</i>	Reibisch, 1895	2010		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Pelagobia longicirrata</i>	Greiff, 1879	1886		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Continued

Table 1 continued

Species	Authority	Year Of re- cord	Status	G	S1	S2	S3	S4	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Hilbigneris gracilis</i>	(Ehlers, 1868)	1969		em	+	+	+	+		+			+	+	+	+	+		+		
<i>Lumbrinerides acuta</i>	(Verrill, 1875)	2008	Qs	em		+	+	+	+	+			+	+	+	+	+		+		
<i>Lumbrineriopsis paradoxa</i>	(Saint-Joseph, 1888)	1970		em	+	+	+	+					+	+	+	+	+		+		
<i>Lumbrineris coccinea</i>	(Renier, 1804)	1970		c	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Lumbrineris inflata</i>	Moore, 1911	2008		eamip		+	+	+	+	+			+	+	+	+	+		+		+
<i>Lumbrineris labrofimbriata</i>	Saint-Joseph, 1888	2008		em		+	+	+					+	+	+	+	+				
<i>Lumbrineris latreilli</i>	Audouin & Milne Edwards, 1834	2008		c	+	+	+	+	+	+	+	+	+	+	+	+	+		+		+
<i>Lumbrineris nonatoi</i>	Ramos, 1976	2008		em		+	+	+	+	+			+	+	+	+	+		+		
<i>Lumbrineris perkinsi</i>	Carrera-Parra, 2001	2008	NIS	em		+	+	+	+	+			+	+	+	+	+		+		
<i>Scoletoma emandibulata mabiti</i>	(Ramos, 1976)	2008		em		+	+	+					+	+	+	+	+		+		
<i>Scoletoma fragilis</i>	(O.F. Müller, 1776)	1923	Sc	eam	+	+	+	+	+	+	+	+	+	+	+	+	+		+		
<i>Scoletoma funchalensis</i>	(Kinberg, 1865)	2008		eam	+	+	+	+	+	+			+	+	+	+	+		+		
<i>Scoletoma inipatiensis</i>	(Claparède, 1868)	1969		emr	+	+	+	+	+	+	+	+	+	+	+	+	+		+		+
<i>Magelona allenii</i>	Wilson, 1958	2008		eam		+	+	+	+	+			+	+	+	+	+		+		
<i>Magelona filiformis</i>	Wilson, 1959	2008		em		+	+	+	+	+			+	+	+	+	+		+		
<i>Magelona minuta</i>	Eliason, 1962	2008		em	+	+	+	+	+	+			+	+	+	+	+		+		
<i>Magelona mirabilis</i>	(Johnston, 1865)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+		+		
<i>Magelona wilsoni</i>	Glémarec, 1966	2008		em		+	+	+	+	+			+	+	+	+	+		+		
<i>Axiotrella constricta</i>	(Claparède, 1868)	2008		c	+	+	+	+	+	+			+	+	+	+	+		+		
<i>Axiotrella rubrocincta</i>	(Johnson, 1901)	2008	Qs&Sc	c	+	+	+	+	+	+			+	+	+	+	+		+		
<i>Chirimia biceps</i>	(M. Sars, 1861)	2008		em	+	+	+	+	+	+			+	+	+	+	+		+		
<i>Euclymene collaris</i>	(Claparède, 1869)	2008		emr	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Euclymene lombricoides</i>	(Quatrefages, 1866)	1970		em	+	+	+	+	+	+			+	+	+	+	+		+		
<i>Euclymene oerstedii</i>	(Claparède, 1863)	2008		eamip	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Euclymene palemitana</i>	(Grube, 1840)	1970		em	+	+	+	+	+	+			+	+	+	+	+		+		
<i>Heteroclymene robusta</i>	Arwidsson, 1906	2008		em	+	+	+	+	+	+			+	+	+	+	+		+		
<i>Johnstonia chymenoides</i>	Quatrefages, 1866	2008		eam	+	+	+	+	+	+			+	+	+	+	+		+		
<i>Leiochone leiopygos</i>	(Grube, 1860)	2008		em	+	+	+	+	+	+			+	+	+	+	+		+		
<i>Leiochone tricornata</i>	Bellán & Reys, 1967	2008		em	+	+	+	+	+	+			+	+	+	+	+		+		
<i>Macroclomene santanderensis</i>	(Rioja, 1917)	2008		em	+	+	+	+	+	+			+	+	+	+	+		+		
<i>Maldane glebifex</i>	Grube, 1860	2008		em	+	+	+	+	+	+			+	+	+	+	+		+		
<i>Maldane sarsi</i>	Malmgren, 1865	2008		em	+	+	+	+	+	+			+	+	+	+	+		+		
<i>Metasychis gotoi</i>	(Izuka, 1902)	2008		eamip	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Micromaldane ornithochaeta</i>	Mesnil, 1897	2008	NIS	emip	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Nicomache lumbricalis</i>	(Fabricius, 1780)	2008		em	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Petaloproctus terricolus</i>	(Quatrefages, 1866)	1969	Qs	eamip	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Praxillella affinis</i>	(M. Sars in G.O. Sars, 1872)	2008		eamip	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Praxillella gracilis</i>	(M. Sars, 1861)	2008		eamip	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Praxillella lophoseta</i>	(Orlandi, 1898)	2008		em	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Praxillella praeternissa</i>	(Malmgren, 1865)	2008	Sc	c	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Aglaophamus agilis</i>	(Langerhans, 1880)	2008		em	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Inermonephthys inermis</i>	(Ehlers, 1887)	2008	Qs	c	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Nephtys caeca</i>	(Fabricius, 1780)	2008		c	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Nephtys ciliata</i>	(Müller, 1788)	2010	Qs	c	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Nephtys cirrosa</i>	Ehlers, 1868	2008		eam	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Nephtys hombergii</i>	Savigny in Lamarek, 1818	1969		eam	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Nephtys hystrix</i>	McIntosh, 1900	1923		em	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Nephtys incisa</i>	Malmgren, 1865	2008		eam	+	+	+	+	+	+			+	+	+	+	+		+		+
<i>Nephtys paradoxa</i>	Malm, 1874	2008		c	+	+	+	+	+	+			+	+	+	+	+		+		+

Continued

Table 1 continued

Species	Authority	Year Of re- cord	Status	G	S1	S2	S3	S4	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Alitta succinea</i>	(Leuckart, 1847)	2008		eamip	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ceratonereis (Composetia) costae</i>	(Grube, 1840)	1970		c		+			+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ceratonereis (Composetia) hirci-nicola</i>	(Eisig, 1870)	2008		amip	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+
<i>Eunereis longissima</i>	(Johnston, 1840)	1928		eam		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Hediste diversicolor</i>	(O.F. Müller, 1776)	2008	Sc	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Micronereis variegata</i>	Claparède, 1863	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Neanthes acuminata</i>	(Ehlers, 1868)	1969	Sc	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Neanthes fucata</i>	(Savigny, 1822)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Neanthes nubila</i>	(Savigny, 1822)	1928		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Nereis funchalensis</i>	(Langerhans, 1880)	1928		eamr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Nereis rava</i>	Ehlers, 1868	1928		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Nereis splendida</i>	Grube, 1840	1928		eamrip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Nereis zonata</i>	Malmgren, 1867	1928		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Perinereis cultrifera</i>	(Grube, 1840)	1928		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Perinereis macropus</i>	(Claparède, 1870)	1928		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Perinereis olivaceae</i>	(Horst, 1889)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Perinereis tenuisetis</i>	(Fauvel, 1915)	1928		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Platynereis coccinea</i>	(Delle Chiaje, 1822)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Platynereis dumerilii</i>	(Audouin & Milne Edwards, 1833)	1928		eamrip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Websterinereis glauca</i>	(Claparède, 1870)	1928		eamr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Arabella geniculata</i>	(Claparède, 1868)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Arabella tricolor</i>	(Montagu, 1804)	1969	Sc	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Drilonereis flum</i>	(Claparède, 1868)	1969		emr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Halla parthenopeia</i>	(Delle Chiaje, 1828)	2008		enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Notocirrus scoticus</i>	McIntosh, 1869	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Aponuphis bilineata</i>	(Baird, 1870)	1970	Sc	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Aponuphis brementii</i>	(Fauvel, 1916)	2008	Sc	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Diopatra neapolitana</i>	Delle Chiaje, 1841	1969		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Hyalinoecia tubicola</i>	(O.F. Müller, 1776)	1963		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Nothria conchylega</i>	(Sars, 1835)	2008	Sc	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Onuphis eremita</i>	Audouin & Milne Edwards, 1833	1969	Sc	emr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Paradiopatra quadricuspis</i>	(M. Sars in G.O. Sars, 1872)	1969	Qs	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Rhamphobrachium (Spinigerium) brevibrachiatum</i>	(Ehlers, 1875)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Armandia cirrhosa</i>	Filippi, 1861	1928		emr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Armandia polyophthalma</i>	Kükenthal, 1887	1969		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ophelia amoureuvi</i>	Bellán & Costa, 1987	2008		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ophelia barquii</i>	Fauvel, 1927	2008		e	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ophelia bicornis</i>	Savigny, 1822	2010	Sc	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ophelia neglecta</i>	Schneider, 1892	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ophelia radiata</i>	(Delle Chiaje, 1828)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ophelia roscoffensis</i>	Augener, 1910	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ophelina acuminata</i>	Ørsted, 1843	2008	Sc	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Polyophthalmus pictus</i>	(Dujardin, 1839)	1928		eamrip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Continued

Table 1 continued

[illegible]

Table 1 continued

Species	Authority	Year Of re- cord	Status	G	S1	S2	S3	S4	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Eulalia bilineata</i>	(Johnston, 1840)	2008	Qs	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Eulalia pusilla</i>	Ørstedt, 1843	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Eulalia viridis</i>	(Linnaeus, 1767)	2008	Sc	emr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Eumida punctifera</i>	(Grube, 1860)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Eumida sanguinea</i>	(Ørsted, 1843)	1928	Sc	enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Hypereteone foliosa</i>	(Quatrefages, 1865)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Lugia pierophora</i>	(Ehlers, 1864)	1970		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Mysta picta</i>	(Quatrefages, 1866)	1969		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Mysta siphodonta</i>	(Delle Chiaje, 1830)	1969		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Mysidides borealis</i>	Théel, 1879	2008	Qs	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Nereiphylla paretii</i>	Blainville, 1828	2010		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Nereiphylla pusilla</i>	(Claparède, 1870)	1970		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Notophyllium foliosum</i>	(Sars, 1835)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Paranaitis kostiensis</i>	(Malmgren, 1867)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Phyllodoce groenlandica</i>	Ørsted, 1842	2008	Qs&Sc	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Phyllodoce lineata</i>	(Claparède, 1870)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Phyllodoce maculata</i>	(Linnaeus, 1767)	1928		enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Phyllodoce madeirensis</i>	Langerhans, 1880	1969	Sc	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Phyllodoce mucosa</i>	Ørsted, 1843	1970		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Pseudomysidides limbata</i>	(Saint-Joseph, 1888)	1970		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Pterocirrus limbatus</i>	(Claparède, 1868)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Pterocirrus macroceros</i>	(Grube, 1860)	1928		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ancistrostylis groenlandica</i>	McIntosh, 1878	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ancistrostylis hamata</i>	(Hartman, 1960)	2008		mip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Pilargis verrucosa</i>	Saint-Joseph, 1899	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Sigambra tentaculata</i>	(Treadwell, 1941)	2008		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Pocillochaetidae																					
<i>Pocillochaetus fulgoris</i>	Claparède in Ehlers, 1875	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Pocillochaetus serpens</i>	Allen, 1904	1928		eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Polygordiidae																					
<i>Polygordius appendiculatus</i>	Fraipont, 1887	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Polygordius taceus</i>	Schneider, 1868	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Acholoe squamosa</i>	(Delle Chiaje, 1827)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Drieschia pelagica</i>	Michaelsen, 1892	2010		mip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Eunoë nodosa</i>	(M. Sars, 1861)	2008		eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Fremia dubia</i>	Viguier, 1912	1912		e	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Fremia propinqua</i>	Viguier, 1920	1920		e	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Gattyana cirrhosa</i>	(Pallas, 1766)	2008	Qs	eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Harmothoe antilopes</i>	McIntosh, 1876	1970		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Harmothoe areolata</i>	(Grube, 1860)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Harmothoe extenuata</i>	(Grube, 1840)	1970		enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Harmothoe fraserthomsoni</i>	McIntosh, 1897	1970		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Harmothoe impar</i>	(Johnston, 1839)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Harmothoe johnstoni</i>	(McIntosh, 1876)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Harmothoe longisetis</i>	(Grube, 1863)	1928		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Harmothoe spinifera</i>	(Ehlers, 1864)	1969		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Lepidasthenia elegans</i>	(Grube, 1840)	2008		enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Lepidasthenia maculata</i>	Potts, 1910	2008	Qs	enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Lepidonotus clava</i>	(Montagu, 1808)	1970		enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Lepidonotus squamatus</i>	(Linnaeus, 1758)	1969	Qs&Sc	enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Malmgrenia castanea</i>	McIntosh, 1876	2008		emr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Malmgrenia ljungmani</i>	(Malmgren, 1867)	1970		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Malmgrenia lumulata</i>	(Delle Chiaje, 1830)	1969		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Polynoe scolopendrina</i>	Savigny, 1822	1970		eamr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Subadyte pellucida</i>	(Ehlers, 1864)	1970		enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Continued

Table 1 continued

Species		Year Of re- cord	Status	G	S1	S2	S3	S4	1	2	3	4	5	6	7	8	9	10	11	12	13
Pontodoridae	<i>Pontodora pelagica</i>	Greiff, 1879	em	1886	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Megadrilus purpureus</i>	(Schneider, 1868)	em	2010	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sabellariidae	<i>Lygdamis muratus</i>	(Allen, 1904)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Phalacrostemma cidariophilum</i>	Marenzeller, 1895	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Sabellaria abveolata</i>	(Linnaeus, 1767)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Sabellaria spinulosa</i>	(Leuckart, 1849)	eam	1969	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Acromegalonema vesiculosum</i>	(Montagu, 1813)	em	2010	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sabellidae	<i>Amphiglena mediterranea</i>	(Leydig, 1851)	e	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Bispira volutacornis</i>	(Montagu, 1804)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Branchioma bombyx</i>	(Dalyell, 1853)	c	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Dialychone dunerificta</i>	(Tovar-Hernandez, Lucciano, Giangrande, 2007)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Dialychone acustica</i>	(Claparède, 1869)	c	1969	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Dialychone collaris</i>	(Langerhans, 1881)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Euchone rosea</i>	(Langerhans, 1884)	em	1970	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Euchone rubrocincta</i>	(Sars, 1862)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Euratella salmacidis</i>	(Claparède, 1869)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Hypsicomus stichophthalmos</i>	(Grube, 1863)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sabellidae	<i>Jasmineira candela</i>	(Grube, 1863)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Jasmineira caudata</i>	(Grube, 1863)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Jasmineira elegans</i>	(Langerhans, 1880)	eam	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Laonome kroyeri</i>	(Saint-Joseph, 1894)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Myxocola aesthetica</i>	(Malmgren, 1866)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Myxocola infundibulum</i>	(Claparède, 1870)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Notaulax phaeotaenia</i>	(Montagu, 1808)	eam	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Amphicorina amandi</i>	(Schmarda, 1861)	enrip	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Pseudopotamilla reniformis</i>	(Claparède, 1864)	eamip	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Sabella discifera</i>	(Bruguière, 1789)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Sabella pavonina</i>	(Grube, 1874)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Sabella spallanzanii</i>	(Savigny, 1822)	eamip	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Asclerocheilus intermedius</i>	(Gmelin, 1791)	em	2010	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Scalibregma inflatum</i>	(Saint-Joseph, 1894)	em	2008	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	<i>Sclerocheilus minutus</i>	(Rathke, 1843)	emr	1928	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
		(Grube, 1863)	em		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Continued

Table 1 continued

Species	Authority	Year Of re- cord	Status	G	S1	S2	S3	S4	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Apomatus similis</i>	Marion & Bobretzky, 1875	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Dirupa arietina</i>	(O. F. Müller, 1776)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ficopomatus enigmaticus</i>	(Fauvel, 1923)	2010	NIS	eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Hydroides dianthus</i>	(Verrill, 1873)	2008		eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Hydroides dirampha</i>	Mörch, 1863	2008	NIS	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Hydroides elegans</i>	(Haswell, 1883)	2008	NIS	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Hydroides norvegica</i>	Gunnerus, 1768	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Hydroides pseudouncinata</i>	Zibrowius, 1968 [original]	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Metavermilia multicristata</i>	(Philippi, 1844)	1927		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Placostegus tridentatus</i>	(Fabricius, 1779)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Protula intestinum</i>	(Lamarck, 1818)	2010		emip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Protula tubularia</i>	(Montagu, 1803)	2010		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Salmacina dyseri</i>	(Huxley, 1855)	2008		emr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Salmacina incrustans</i>	Claparède, 1870	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Semivermilia agglutinata</i>	(Marenzeller, 1893)	1927		emr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Semivermilia crenata</i>	(O. G. Costa, 1861)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Serpula concharum</i>	Langerhans, 1880	2010		eamr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Serpula lobiancoi</i>	Rioja, 1917	2008		emr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Serpula vermicularis</i>	Linnaeus, 1767	1928		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Spiraserpula massiliensis</i>	(Zibrowius, 1968)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Spirobranchus lamareki</i>	(Quatrefages, 1866)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Spirobranchus triquetus</i>	(Linnaeus, 1758)	2008		eamr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Vermiliopsis infundibulum</i>	(Philippi, 1844)	2008		c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Vermiliopsis labiata</i>	(O. G. Costa, 1861)	2008		eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Vermiliopsis striaticeps</i>	(Grube, 1862)	2008		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Claparedepelogenia inclusa</i>	(Claparède, 1868)	1923		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Euthalenessa oculata</i>	(Peters, 1854)	1970		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Fimbriosthenelais minor</i>	(Pruvot & Racovitza, 1895)	1970		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Labioleanira yhleni</i>	(Malmgren, 1867)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Leanira hystrix</i>	Ehlers, 1874	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Neoleanira tetragona</i>	(Ørsted, 1845)	2008	Qs	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Pelogenia arenosa</i>	(Delle Chiaje, 1830)	1969		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Pholoides dorsipapillatus</i>	(Marenzeller, 1893)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Pisone remota</i>	(Southern, 1914)	1970		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Sigalion mathildae</i>	Audouin & Milne Edwards in Cuvier, 1830	2008		emr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Sigalion squamosus</i>	Delle Chiaje, 1830	1970		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Sthenelais boa</i>	(Johnston, 1833)	1969		eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Sthenelais limicola</i>	(Ehlers, 1864)	1970		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ephesiella abyssorum</i>	(Hansen, 1878)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Sphaerodoridium claparedii</i>	(Greeff, 1866)	2010		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Sphaerodoridium minutum</i>	(Webster & Benedict, 1887)	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Sphaerodoridium gracilis</i>	(Rathke, 1843)	2008	Qs	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Spintheridae</i>	<i>Spinther articus</i>	2008		em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Continued

Table 1 continued

Species	Authority	Year Of re- cord	Status	G	S1	S2	S3	S4	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Anoides oxycephala</i>	(Sars, 1862)	1969	enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Anoides paucibranchiata</i>	Southern, 1914	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Auropsio banyulensis</i>	(Laubier, 1966)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Boccardia polybranchia</i>	(Haswell, 1885)	2008	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Boccardiella ligerica</i>	(Ferrière, 1898)	2010	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Dipolydora armata</i>	(Langerhans, 1880)	2008	eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Dipolydora coeca</i>	(Orsted, 1843)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Dipolydora flava</i>	(Claparède, 1870)	2008	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Dipolydora giardi</i>	(Mesnil, 1893)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Dipolydora quadrilobata</i>	(Jacobi, 1883)	2010	enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Laonice cirrata</i>	(M. Sars, 1851)	1927	Qs&Sc	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Malacoceros fuliginosus</i>	(Claparède, 1868)	1969	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Malacoceros girardi</i>	Quatrefages, 1843	1969	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Malacoceros tetracerus</i>	(Schmarda, 1861)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Microspio mecnikowianus</i>	(Claparède, 1869)	1969	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Paraprionospio pinnata</i>	(Ehlers, 1901)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Polydora ciliata</i>	(Johnston, 1838)	2008	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Polydora hoplura</i>	(Claparède, 1868)	2008	eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Prionospio caspersi</i>	(Laubier, 1962)	2008	e	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Prionospio cirrifera</i>	Wirén, 1883	1928	Qs	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Prionospio decipiens</i>	Söderström, 1920	2010	Qs	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Prionospio ehlersi</i>	Fauvel, 1928	2008	eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Prionospio fallax</i>	Claparède, 1869	2008	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Prionospio steenstrupi</i>	Malmgren, 1867	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Pseudopolydora antennata</i>	(Claparède, 1869)	1969	eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Pygospio elegans</i>	Claparède, 1863	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Scolecopsis (Parascolelepis) tridentata</i>	(Southern, 1914)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Scolecopsis (Scolelepis) cantabra</i>	(Rioja, 1918)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Scolecopsis (Scolelepis) foliosa</i>	(Audouin & Milne Edwards, 1833)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Scolecopsis (Scolelepis) squamata</i>	(O.F. Muller, 1806)	1969	eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Scolecopsis bonnier</i>	(Mesnil, 1896)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Spio decorata</i>	Bobretzky, 1870	1969	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Spio multioculata</i>	(Rioja, 1918)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Spiophanes bombyx</i>	(Claparède, 1870)	2008	c	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Spiophanes kroyeri</i>	Grube, 1860	2008	emr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Spiophanes reysi</i>	Laubier, 1964	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Streblospio shrubsolii</i>	(Buchanan, 1890)	2010	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sternaspidae																					
<i>Sternaspis scutata</i>	(Ranzani, 1817)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Amblyosyllis formosa</i>	(Claparède, 1863)	1886	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Anoplosyllis edenula</i>	Claparède, 1868	2010	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Branchiosyllis exilis</i>	(Gravier, 1900)	2008	mrip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Brania pusilla</i>	(Dujardin, 1851)	2008	eamrip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Epigamita alexandri</i>	(Malmgren, 1867)	2008	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Euryssyllis tuberculata</i>	Ehlers, 1864	1928	emr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Euryssyllis assimilis</i>	Marenzeller, 1875	2008	emr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Euryssyllis blomstrandii</i>	Malmgren, 1867	1928	eamr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Euryssyllis lamelligera</i>	Marion & Bobretzky, 1875	2008	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Exogone (Parexogone) cognettii</i>	Castelli, Badalamenti & Lardici, 1987	2010	em	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Exogone (Sylline) brevipes</i>	(Claparède, 1864)	2010	enrip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Continued

Table 1 continued

Species	Authority	Year Of re- cord	Status	G	S1	S2	S3	S4	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Exogone naidina</i>	Ørsted, 1845	1886		eam	+	+			+	+	+	+	+	+		+	+	+	+		
<i>Exogone verugera</i>	(Claparède, 1868)	2008		eam	+	+			+	+	+	+	+	+		+	+	+	+		
<i>Haplosyllis spongicola</i>	(Grube, 1855)	1928	Sc	enip	+	+		+	+	+	+	+	+	+	+	+	+	+	+		+
<i>Myrianida brachycephala</i>	(Marenzeller, 1874)	2008		em																	
<i>Myrianida inermis</i>	(Saint Joseph, 1887)	2010	Qs	em				+	+	+	+	+	+	+	+	+	+	+	+		
<i>Myrianida pinnigera</i>	(Montagu, 1808)	1886		em					+	+	+	+	+	+	+	+	+	+	+		
<i>Myrianida prolifera</i>	(O.F. Müller, 1788)	1886		emr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Nudisyllis divaricata</i>	(Kieferstein, 1862)	1928		eam				+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Nudisyllis pulligera</i>	(Krohn, 1852)	1928		eam	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Odontosyllis ctenostoma</i>	Claparède, 1868	1928		eam	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Odontosyllis dugesiana</i>	Claparède, 1864	1928		em					+	+	+	+	+	+	+	+	+	+	+	+	
<i>Odontosyllis fulgurans</i>	(Audouin & Milne Edwards, 1833)	2010		c	+				+	+	+	+	+	+	+	+	+	+	+	+	
<i>Odontosyllis gibba</i>	Claparède, 1863	1928		em		+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Palposyllis prosotoma</i>	Hartmann-Schröder, 1977	2010		em	+			+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Parahelersia ferrugina</i>	(Langerhans, 1881)	2010		c	+				+	+	+	+	+	+	+	+	+	+	+	+	
<i>Parapionosyllis brevicirra</i>	Day, 1954	2008		em	+	+			+	+	+	+	+	+	+	+	+	+	+	+	
<i>Parapionosyllis elegans</i>	(Pierantoni, 1903)	2010	Qs	em	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	
<i>Parexogone hebes</i>	(Webster & Benedict, 1884)	2008		eam				+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Proceræa aurantiaca</i>	Claparède, 1868	2008		em	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	
<i>Proceræa picta</i>	Ehlers, 1864	1928		enip		+			+	+	+	+	+	+	+	+	+	+	+	+	
<i>Proceræa halleziana</i>	Malaquin, 1893	2008		em		+			+	+	+	+	+	+	+	+	+	+	+	+	
<i>Prophaerosyllis tetralix</i>	(Eliason, 1920)	2008		em		+			+	+	+	+	+	+	+	+	+	+	+	+	
<i>Salvatoria clavata</i>	(Claparède, 1863)	1928		eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Salvatoria eurtimica</i>	(Sardá, 1984)	2008		eam		+			+	+	+	+	+	+	+	+	+	+	+	+	
<i>Salvatoria limbata</i>	(Claparède, 1868)	1886		emr	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Salvatoria tenuicirrata</i>	(Claparède, 1864)	1886	Qs	emr	+	+			+	+	+	+	+	+	+	+	+	+	+	+	
<i>Sphaerosyllis bulbosa</i>	Southern, 1914	2008		em	+	+			+	+	+	+	+	+	+	+	+	+	+	+	
<i>Sphaerosyllis hystrix</i>	Claparède, 1863	1886		eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Sphaerosyllis ovigera</i>	Langerhans, 1879	2008	Qs	eam	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Sphaerosyllis papillifera</i>	Naville, 1933	2008		c		+			+	+	+	+	+	+	+	+	+	+	+	+	
<i>Sphaerosyllis pirifera</i>	Claparède, 1868	1886		em	+	+			+	+	+	+	+	+	+	+	+	+	+	+	
<i>Streptosyllis bidentata</i>	Southern, 1914	2010	Qs	eam	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Streptosyllis varians</i>	Webster & Benedict, 1887	2010		em	+	+			+	+	+	+	+	+	+	+	+	+	+	+	
<i>Streptosyllis websteri</i>	Southern, 1914	2008		eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis alternata</i>	Moore, 1908	2008	Sc	em	+	+			+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis amica</i>	Quatrefages, 1866	1928		c	+	+			+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis armillaris</i>	(O.F. Müller, 1776)	1970		c	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis columbretensis</i>	(Campoy, 1982)	2008		em	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis cornuta</i>	Rathke, 1843	1928	Qs	enip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis garciai</i>	(Campoy, 1982)	2008		eam		+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis gerlachi</i>	(Hartmann-Schröder, 1960)	2008		eamr		+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis gracilis</i>	Grube, 1840	1928	Sc	c	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis hyalina</i>	Grube, 1863	2008		c	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis krohnii</i>	Ehlers, 1864	1928		eamip	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis prolifera</i>	Krohn, 1852	1928		eamip	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis pulvinata</i>	(Langerhans, 1881)	2008		eamr		+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis rosea</i>	(Langerhans, 1879)	2008		eamr		+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis torquata</i>	Marion & Bobretsky, 1875	2008		em	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis variegata</i>	Grube, 1860	2008		c	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Syllis vittata</i>	Grube, 1840	1928		eam		+		+	+	+	+	+	+	+	+	+	+	+	+	+	

Continued

Table 1 continued

Species	Authority	Year Of re- cord	Status	G	SI	S2	S3	S4	1	2	3	4	5	6	7	8	9	10	11	12	13
Syllidae																					
<i>Syllis vivipara</i>	Krohn, 1869	2008	em					+													
<i>Synmerosyllis lamelligera</i>	(Saint-Joseph, 1886)	2010	eam						+												
<i>Trypanosyllis (Trypanosyllis)</i>																					
<i>Trypanosyllis coeliaca</i>	Claparède, 1868	1928	eam					+													
<i>Trypanosyllis zebra</i>	(Grube, 1860)	1928	Sc																		
<i>Virchowia clavata</i>	Langerhans, 1879	1886	em																		
<i>Amphitrite cirrata</i>	Müller, 1776	2008	eam						+												
<i>Amphitrite rubra</i>	(Risso, 1826)	2008	em					+													
<i>Amphitrite variabilis</i>	(Risso, 1826)	1970	c																		
<i>Amphitritides gracilis</i>	(Grube, 1860)	2008	em																		
<i>Eupolymnia nebulosa</i>	(Montagu, 1819)	2008	eamrip																		
<i>Eupolymnia nesidensis</i>	(Delle Chiaje, 1828)	2008	eam																		
<i>Lanice conchilega</i>	(Pallas, 1766)	1969	c																		
<i>Lysilla loveni</i>	Malmgren, 1866	2008	em																		
<i>Neomphitrite affinis</i>	(Malmgren, 1866)	2010	em																		
<i>Neomphitrite edwardsi</i>	(Quatrefages, 1865)	2008	em																		
<i>Neomphitrite figulus</i>	(Dalyell, 1853)	2008	eam																		
<i>Nicolea venustula</i>	(Montagu, 1819)	1970	em																		
<i>Nicolea zostericola</i>	Örsted, 1844	2008	em																		
<i>Pista cretacea</i>	(Grube, 1860)	2008	em																		
<i>Pista cristata</i>	(Müller, 1776)	1969	c																		
<i>Pista maculata</i>	(Dalyell, 1853)	2008	eam																		
<i>Pista unibranchia</i>	Day, 1963	2008	enrip																		
<i>Polycirrus aurantiacus</i>	Grube, 1860	2008	eam																		
<i>Polycirrus denticulatus</i>	Saint-Joseph, 1894	2008	em																		
<i>Polycirrus haematodes</i>	(Claparède, 1864)	2008	em																		
<i>Polycirrus medusa</i>	Grube, 1850	2008	em																		
<i>Proclea graffii</i>	(Langerhans, 1884)	2008	em																		
<i>Sireblosoma bairdi</i>	(Malmgren, 1866)	2008	eam																		
<i>Terebella lapidaria</i>	Linnaeus, 1767	2008	emr																		
<i>Thelepus cincinnatus</i>	(Fabricius, 1780)	2008	eam																		
<i>Thelepus setosus</i>	(Quatrefages, 1866)	2008	enrip																		
<i>Thelepus triserialis</i>	(Grube, 1855)	1927	enrip																		
Tomopteridae																					
<i>Tomopteris (Johnstonella) levipes</i>	(Greeff, 1879)	1886	eam																		
<i>Tomopteris (Johnstonella) pacifica</i>	(Izuka, 1914)	1886	eam																		
Travisiidae																					
<i>Travisia forbesii</i>	Johnston, 1840	2010	em																		
Trichobranchiidae																					
<i>Octobranchus lingulatus</i>	(Grube, 1863)	2008	em																		
<i>Terebellides stroemii</i>	Sars, 1835	1927	Qs&Sc																		
<i>Trichobranchus glacialis</i>	Malmgren, 1866	2008	eam																		
Total number of species																					
					371	430	300	195	216	492	180	507	534	406	305	462	488	189	348	110	151

(www.marinespecies.org; accessed on 25 January 2019). Comments are added for any questionable species present in either Algerian and Mediterranean waters. Uncertainty arose mainly for species complexes belonging to the Cirratulidae and Spionidae families.

In the current study, an abundant literature was consulted before attributing a status to each Algerian polychaete species (Çinar, 2003, 2005, 2009, 2013; Çinar & Ergen, 2003; Çinar *et al.*, 2003, 2014; Zenetos *et al.*, 2005, 2010, 2011, 2012, 2017; Gravili *et al.*, 2010; Gil, 2011; Occhipinti-Ambrogi *et al.*, 2011; Evagelopoulou *et al.*, 2015; Corriero *et al.*, 2016; Galil *et al.*, 2016; Ouni-Ben Amor *et al.*, 2016; Faulwetter *et al.*, 2017; López & Richter, 2017).

To specify the status of a species found in Algerian waters, it was classified into one of three groups as proposed by Zenetos *et al.* (2011) and used by Faulwetter *et al.* (2017): Non-Indigenous Species (NIS), Questionable Species (Qs) and Species Complexes.

“Questionable species” are defined as either those reported as found in Algerian waters but whose presence still needs to be confirmed, or those, which have an unresolved taxonomic status. In this study, if records of any species are in doubt, they are not automatically classified as NIS if they have never been previously reported as NIS anywhere else in the Mediterranean. On the other hand, species already reported as NIS from other studies in the Mediterranean Sea but which still retain a questionable status, are listed as “NIS Questionable” to highlight this unresolved matter in the case of further assessments.

Species complexes correspond to those species known to form a complex of cryptic (morphologically indistinguishable but genetically different) or pseudo-cryptic (morphologically very similar) species (Nygren & Pleijel, 2011). The term ‘Species complex’ indicates that the name has been applied to a species as defined above.

Geographical patterns of polychaetes from the Algerian coasts

The distribution of the 534 polychaete species found in Algerian waters is categorised taking into account the distinct geographical areas of the Mediterranean and related maritime regions as proposed by Coll *et al.* (2010) and modified by Bakalem *et al.* (2020). These are, 1: African Atlantic Coast (from Cap Spartel to Cap Blanc); 2: North-Eastern Atlantic European waters; 3: Alboran Sea; 4: North-Western Mediterranean; 5: Algeria South-Western Mediterranean; 6: Ionian Sea; 7: Tunisian shelf and Libya; 8: Adriatic Sea; 9: Aegean Sea; 10: Black Sea; 11: Levantine Sea; 12: Red Sea and 13: Indo-Pacific oceans.

Each polychaete species found on the Algerian coast, is classified as one of fifteen groups reflecting their geographical origin (Bakalem *et al.*, 2020): eam (Mediterranean, European and African Atlantic species); em (Mediterranean and European Atlantic species); am (Mediterranean and African Atlantic coast species); e (endemic species); c (cosmopolitan species); emr (Mediterranean, European Atlantic and Red Sea species); emip (Mediterranean, European Atlantic and Indo-Pacific species); amr (African Atlantic, Mediterranean and Red Sea species); amip (African Atlantic, Mediterranean and Indo-Pacific species); mip (Mediterranean and Indo-Pacific species); emrip (European Atlantic, Mediterranean, Red Sea and Indo-Pacific species); eamrip (European and African Atlantic, Mediterranean, Red Sea and Indo-Pacific species); eamip (European and African Atlantic, Mediterranean and Indo-Pacific species); eamr (European and African Atlantic, Mediterranean and Red Sea species) and mrip (Mediterranean, Red Sea and Indo-Pacific species).

Hierarchical Cluster Analysis (HCA) based on Soerensen’s coefficient for the presence/absence of the species found in each of the four sectors of the Algerian coast and in the 13 geographical areas was carried out along with the construction of a dendrogram using the group average algorithm generated from the PRIMER V6 software (Clarke & Gorley, 2006).

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Results

List of species

Studies on the presence of polychaetes along the Algerian coasts have been sporadic. Viguié (1886, 1911, 1912, 1920) and later, Gravier & Dantan (1928), all collected pelagic species from the Bay of Algiers, whilst Fauvel (1923, 1927a,b) focused on benthic species in the waters surrounding Algiers and Annaba. These focused studies only found a small number of polychaete families and species: between 8 and 18 families covering 25 to 69 species. More recently, Le Gall (1969) and Falconetti (1970) studied the Phanerogam meadows and maërl community respectively, (located in the Bay of Bou Ismail), and reported between them a total of 27 families and 72 species.

The present inventory of polychaete species is mainly compiled from data collected in three successive periods: the first was from 1886 to 1928, (leading to 28 families and 96 species), the second from 1963 to 1970, (leading to 44 families and 196 species), and finally from 1975 to 2010, (leading to the final list with 58 families and 534 species). During these three periods, the number of recorded species increased from 96 to 534. The PhD theses of Bakalem (2008) and Grimes (2010), which together, covered most of the soft-bottom habitats in the gulfs, bays and harbours along the Algerian coasts, listed the greatest numbers of polychaetes with 54 and 51 families and 444 and 506 species, respectively. It is noteworthy that there were no studies reporting new polychaetes between 1928 and 1963, and none have taken place since 2011.

The Syllidae (66 species representing 12% of the total diversity) is the most diversified family, followed by the Spionidae (37 species, 7%), the Terebellidae (27 species, 5%), the Serpulidae (25 species, 4.5%), the Polynoidae (24 species, 4.5%), the Sabellidae (23 species, 4%) and the Paraonidae (23 species, 4%).

Ten families (each with more than 20 species) account

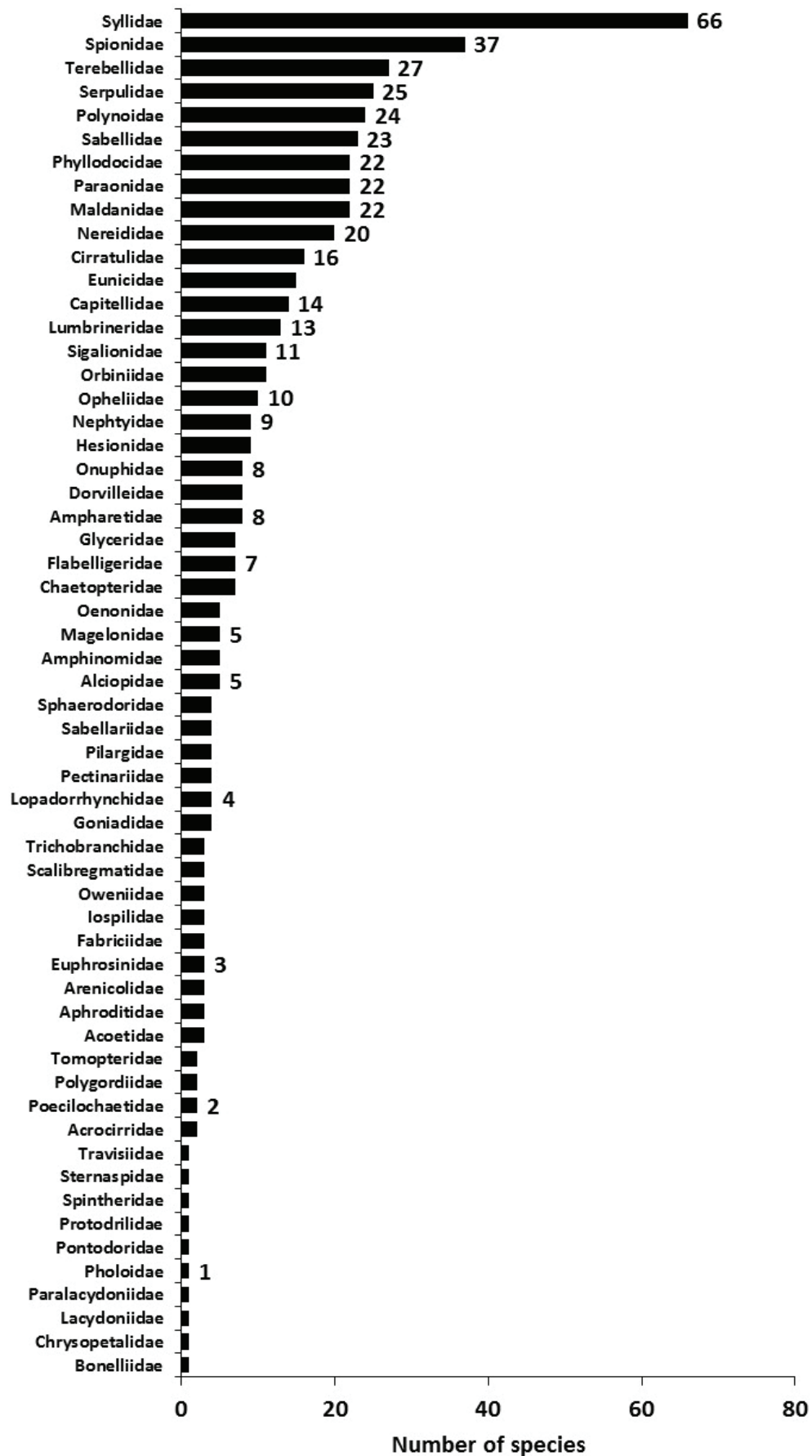


Fig. 2: Number of polychaete species per family classified by decreasing number of species.

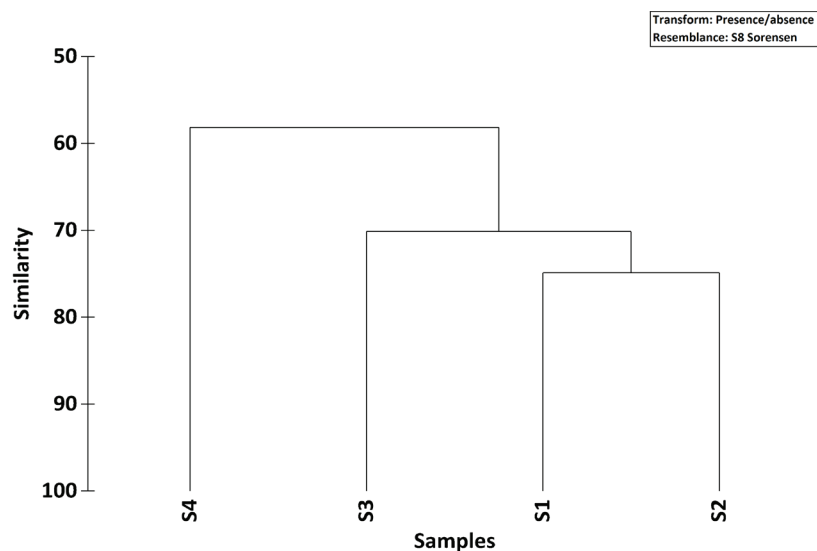


Fig. 3: Results of cluster analysis (Sørensen similarity) on the presence and absence of species, in the four defined sectors (S1 to S4 see Fig. 1) along the Algerian coast.

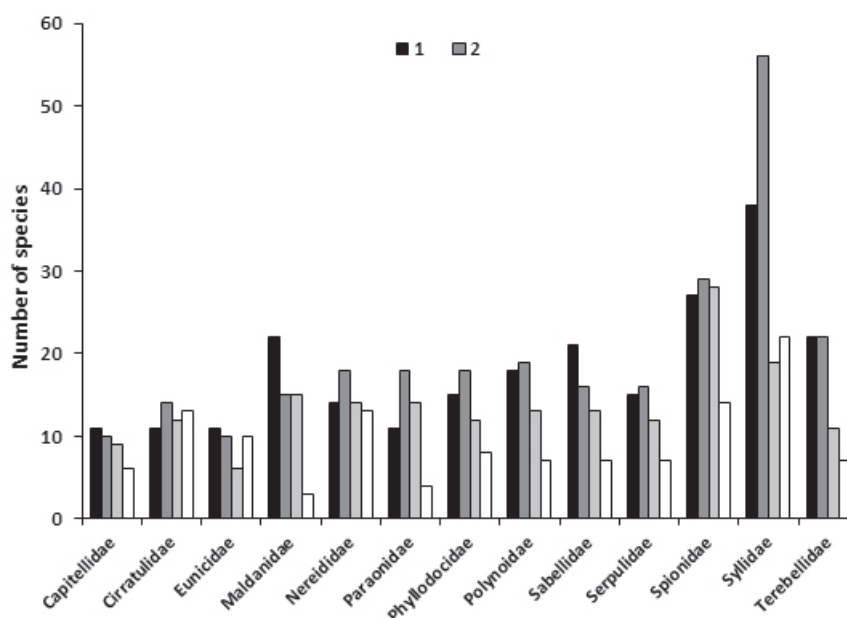


Fig. 4: Number of species present of the ten most diversified families in the four defined sectors (see Fig. 1) along the Algerian coast.

for 55% of polychaetes diversity (Fig. 2); seven families are contain between 10 and 20 species, whilst most of the remaining families (41) have fewer than 10 species; moreover, ten families are only represented by a single species (Fig. 2).

Out of the 534 species reported, 22 are planktonic, including five families with a strictly pelagic life style: Alciopidae (5 species), Lopadorhynchidae (4), Iosipilidae (3), Tomopteridae (2) and Pontodoridae (1). Five species, two of *Ancistrosyllis* (Pilargidae), two of Polynoidae and one Nereididae belonging to families of benthic polychaetes are all pelagic.

The previously defined geographical sector 2 was found to be the richest in terms of polychaete diversity with 56 families and 430 species (representing 81% of the total recorded species). Sector 1 with 48 families (371

species, 69%) supported the second largest diversity. The eastern sectors were relatively poorer in terms of diversity with 49 families (300 species, 56%) in sector 3 and 40 families (195 species, 37%) in sector 4. Figure 3 compares the similarities between the four sectors; sector 4 is very different from the three other sectors, whilst sectors 1 and 2 (in the western and central parts, which display the richest diversity), also show the greatest similarity. Families are represented by a similar number of species in all except sector 3 where the family of Syllidae is more diversified (Fig. 4).

Questionable species (Qs) and species complexes

Among the 534 species recorded along the Algerian coast, 45 correspond to the status “questionable species” and 38 are considered nowadays to be species complexes, these numbers respectively 8 and 6.5% of the total richness amongst the polychaete (Table 1). Further data will be required to confirm their presence in Algerian waters. It should be noted that most of these species have already been previously reported in other polychaete inventories (e.g., Faulwetter *et al.*, 2017).

The following taxa are classified as both questionable species and species complex: *Axiiothella rubrocincta* (Johnson, 1901), *Capitella capitata* (Fabricius, 1780), *Chaetozone setosa* Malmgren, 1867, *Laonice cirrata* (M. Sars, 1851), *Lepidonotus squamatus* (Linnaeus, 1758), *Phyllodoce groenlandica* Örsted, 1842, *Protocirrinieris chrysoderma*, (Claparède, 1868), and *Terebellides stroemii* Sars, 1835.

Ampharete acutifrons (Grube, 1860) may have been confused with *Ampharete lindstroemi* Hessle, 1917 in the Mediterranean Sea (Mikac, 2015) and in samples found in Algerian waters. It forms a species complex in its North Atlantic and Pacific distributions (Faulwetter *et al.*, 2017). *Ampharete grubei* Malmgren, 1865 is often reported as *A. acutifrons*, which is also present in Greek waters (Faulwetter *et al.*, 2017).

The specimens reported as *Chaetozone setosa* Malmgren, 1867 in the Mediterranean Sea and along the Algerian coast, corresponds to several possible species such as *Chaetozone gibber* Woodham & Chambers,

1994, *Chaetozone corona* Berkeley & Berkeley, 1941 or *Chaetozone carpenteri* McIntosh, 1911: it probably does not exist in the Mediterranean Sea (Çinar & Ergen, 2007; Faulwetter *et al.*, 2017).

Specimens of polychaetes from the Mediterranean previously named as *Terebellides stroemii* almost certainly belong to different species including *Terebellides gracilis* (Malm, 1874) and *Terebellides mediterranea* Parapar, Mikac and Fiege, 2013 (Faulwetter *et al.*, 2017).

Non-Indigenous Species (NIS)

Out of the 534 species reported along the Algerian coast, eight have the status NIS in the Mediterranean Sea: *Aricidea (Aricidea) fragilis* (Webster, 1879), *Ficopomatus enigmaticus* (Fauvel, 1923), *Hydroides dirampha* Mörch, 1863 and *H. elegans* (Haswell, 1883), *Lumbrineris perkinsi* Carrera-Parra, 2001, *Metasychis gotoi* (Izuka, 1902), *Notomastus aberans* Day, 1957 and *Pista unibranchia* Day, 1963.

Seven species found along the Algerian coast were reported in the list compiled by Zenetos *et al.* (2017). They were *Ficopomatus enigmaticus* (Fauvel, 1923), *Hydroides dirampha* Mörch, 1863 and *H. elegans* (Haswell, 1883), *Lumbrineris perkinsi* Carrera-Parra, 2001, *Metasychis gotoi* (Izuka, 1902), *Pista unibranchia* Day, 1963, and *Notomastus aberans* Day, 1957. *Aricidea (Aricidea) fragilis* (Webster, 1879) was a typically west-Atlantic species. It was present in the Adriatic and Tyrrhenian seas and in the Strait of Sicily (Langeneck *et al.*, 2018). The

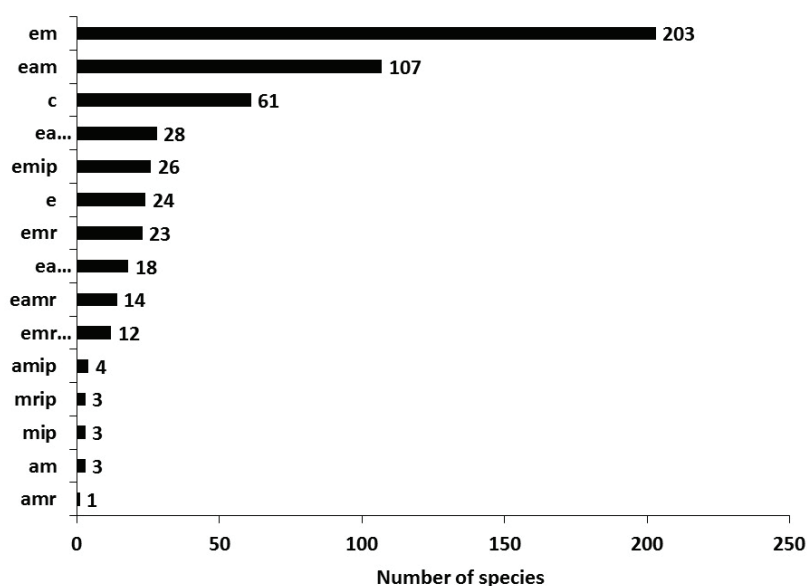


Fig. 5: Number of species present in the different geographical groups. Legend: amr: African Atlantic, Mediterranean and Red Sea species, amip: African Atlantic, Mediterranean and Indo-Pacific species, mip: Mediterranean and Indo-Pacific species, mrip: Mediterranean, Red Sea and Indo-Pacific species, am: Mediterranean and African Atlantic species, emrip: European Atlantic, Mediterranean, Red Sea and Indo-Pacific species, eamr: European Atlantic, African Atlantic, Mediterranean and Red Sea species, eamrip: European Atlantic, African Atlantic, Mediterranean, Red Sea and Indo-Pacific species, emr: European Atlantic, Mediterranean and Red Sea species, eamip: European Atlantic, African Atlantic, Mediterranean and Indo-Pacific species, emip: European Atlantic, Mediterranean and Indo-Pacific species, e: endemic species, c: cosmopolitan species, eam: European Atlantic, Mediterranean and African Atlantic species, em: European Atlantic and Mediterranean species.

status of NIS is also given for this species present along the Algerian coast.

Geographical patterns of Polychaetes of the Algerian coasts

Most of the Polychaetes found in Algerian waters have an Atlantic-Mediterranean origin (315 species, 50% of the total number recorded). 203 species (38%) are common to the Mediterranean Sea and the North-Eastern Atlantic coast, whereas 107 species (20%) are common to the Mediterranean Sea, the North-Eastern Atlantic and African Atlantic coast and only three species share a Mediterranean and African Atlantic distribution (Fig. 5). The cosmopolitan species (61) and endemic species (24) make up 11.5 and 5% of all species respectively. 122 species (23% of the total) show a wide distribution across the North-Eastern Atlantic Ocean, the Mediterranean and Red Seas as well as being found in the Indo-Pacific region. Only six species (1%) share a Mediterranean, Red Sea and Indo-Pacific distribution.

A total of 492 species from the European Atlantic Ocean and 507 from the North-Western Mediterranean Sea were reported as found along the Algerian coast; these species make up 92 and 95% respectively of the total inventory. The Aegean and Adriatic Seas have a high number of polychaete species in common with the Algerian coasts, respectively 488 (91%) and 462 (86%) species, whereas a significant number are in common with the Ionian Sea (406 species and 76%), the Levantine Sea (348 species, 66%) and with the Tunisian shelf extending to Libya (305 species, 57%). By contrast, the Alboran Sea (180 species, 34%) and the Black Sea (189 species, 35%) both share a relatively low number common of species with the Algerian coast. The number of species shared between the Algerian coast and the Red Sea (110 species, 21%) and the Indo-Pacific (151 species, 28%) was low.

The geographical distributions of the 534 species recorded from the Algerian coast (Table 1) are compared with their presence in 12 other geographical areas. Differences were analysed using the Sorensen coefficient (Fig. 6). The dendrogram showing the Sorensen similarity between the 13 geographical areas suggests the division of these areas into two main groups. The first group comprises only two areas, the Red Sea (labelled 12 in Fig. 6) and the Indo-Pacific region (13) whereas the second group encompasses all the 11 other areas. Within this second group, the Alboran Sea (3), the Black Sea (10) and the African Atlantic coast (1) show the lowest level of similarities with the other areas in the same group. However, the remaining eight areas display a high level of similarity and form an distinct pattern with the Tunisian shelf and Libya (7), Levantine Sea (11), Ionian Sea (6), Adriatic Sea (8), North-Eastern Atlantic European (2), Algeria (South-Western Mediterranean) (5), North-Western Mediterranean (4) and Aegean Sea (9). The highest similarities (>90%) are found between the North-Eastern Atlantic European waters (2) and the Algerian south-western Mediterranean (5) and also between the North-Western Mediterranean (4) and the Aegean Sea (9) (Fig. 6).

Discussion

The estimated total number of polychaete species varies depending on the author (Arvanitidis *et al.*, 2002; Coll *et al.*, 2010); the most recent census of polychaete species for the Mediterranean Sea is that of Faulwetter *et al.* (2017) who recorded 1,105 species. With 534 species, the polychaetes of the Algerian coasts represent 48% of the polychaete fauna found in the Mediterranean Sea and this diversity is appreciable in comparison with those noted in other areas of the Mediterranean Sea (Table 2).

However, the inventory of Faulwetter *et al.* (2017) do

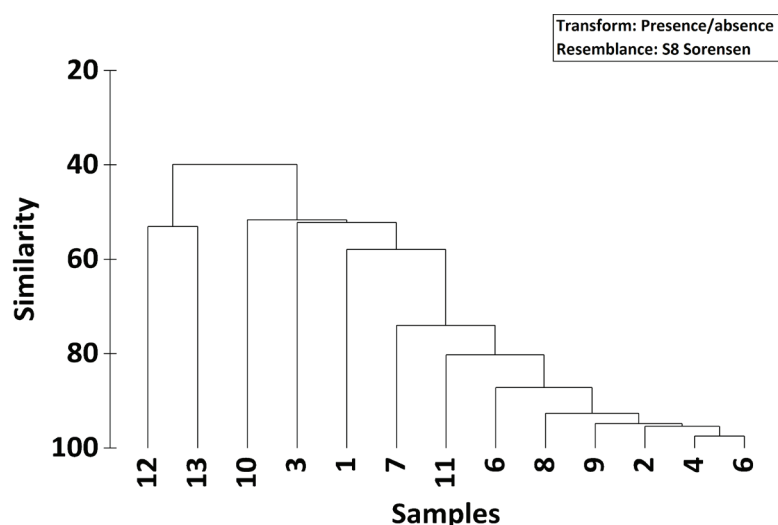


Fig. 6: Results of cluster analysis (Sørensen similarity) on the species presence and absence in 13 geographical regions. 1: African Atlantic Coast (from Cap Spartel to Cap Blanc); 2: North-Eastern Atlantic European waters; 3: Alboran Sea; 4: North-Western Mediterranean; 5: Algerian South-Western Mediterranean; 6: Ionian Sea; 7: Tunisian Shelf and Libya coastline; 8: Adriatic Sea; 9: Aegean Sea; 10: Black Sea; 11: Levantine Sea; 12: Red Sea and 13: Indo-Pacific Oceans.

Table 2. Comparison of inventories of polychaetes species found in different areas of the Mediterranean Sea.

Author (s)	Areas	Species	Comments
Arvanitidis <i>et al.</i> , 2002	Mediterranean and Black seas	1,036	All species recorded including questionable species
Coll <i>et al.</i> , 2010	Mediterranean Sea	1,122	Few data in the southern part of the Mediterranean Sea
Faulwetter <i>et al.</i> , 2017	Mediterranean Sea	1,105	Number standardised to currently accepted names in 2017
Gillet, 2017	Morocco (Atlantic and Mediterranean)	321	Continental shelf species
Dauvin <i>et al.</i> , 2006	Mediterranean French continental shelf	623	Continental shelf species
	Gulf of Lions	641	Continental and bathyal species
	Gulf of Lions	487	Continental shelf species
	Provence-Alpes-Côte d’Azur coast	516	Continental shelf species
	Corsica	256	Continental shelf species, few data around Corsica
Castelli <i>et al.</i> , 2008	Italian waters	876	Including questionable species
Mikac, 2015	Adriatic Sea	764	Including questionable species
Ayari <i>et al.</i> , 2009	Tunisia	289	Few data for the southern part of the Tunisia
Zaâbi <i>et al.</i> , 2012	Cap Bon Peninsula, Tunisia	212	North-east coast of Tunisia
Zaâbi <i>et al.</i> , 2012	Tunisia	375	New cumulative number
Fersi <i>et al.</i> , in preparation	Tunisia	443	Indicative total number
Arvanitidis, 2000	Aegean Sea	592	0-1000 m, except Turkish coast
Simboura & Nicolaidou, 2001	Greek waters	753	Census from 1891 to 2000
Arvanitidis <i>et al.</i> , 2002	Western Basin of the Mediterranean	884	All species recorded including questionable species
	Central Basin of the Mediterranean	528	All species recorded including questionable species
	Levantine Basin of the Mediterranean	451	All species recorded including questionable species
	Aegean Sea	493	All species recorded including questionable species
Faulwetter <i>et al.</i> , 2017	Greek waters	836	Including 142 questionable species
Çinar <i>et al.</i> , 2014	Mediterranean coasts of Turkey	705	Including questionable species
Çinar, 2005	Cyprus waters	456	All species recorded including questionable species
Şahin & Çinar, 2012	Black Sea	238	New cumulative number
Dorgham <i>et al.</i> , 2013	Egyptian Mediterranean waters	283	Including questionable species
This study	Algerian waters	534	Species mainly found on the continental shelf

not include 45 of the 534 Algerian species. Moreover, this value of 534 species may also be under-estimated due to: 1) the low level of study and sampling in the eastern part of the Algerian coast (sectors 3 and 4); 2) the few studies of exceptional habitats (including the phanerogams, shallow and deep hard substratum as well as coralligenous formations and the bathyal benthic zone), and 3) the absence of molecular analyses applied to those questionable species and species complexes, those Non-Native species and those species classified as “cosmopolitan”.

The richness of polychaete species along the coast of Algeria is comparable to that reported for the continental shelf of the French Mediterranean coast (Dauvin *et al.*, 2006) and also to that for the Greek part of the Aegean Sea (Arvanitidis, 2000) (Table 2). This richness is higher

than that found in bordering countries such as Morocco, with 321 species listed including the Atlantic coast of Morocco (Gillet, 2017), and Tunisia with 443 species (Ayari *et al.*, 2009; Zaâbi *et al.*, 2012). It is also higher than that observed for the Black Sea (Şahin & Çinar, 2012). Nevertheless, an even greater diversity of polychaetes have been found for Greek waters (Faulwetter *et al.*, 2017), along the Italian coast (Castelli *et al.*, 2008), in Turkish waters (Çinar *et al.*, 2014), and in the Adriatic Sea (Mikac, 2015).

In the coasts of Algeria, the families of Syllidae, Spionidae, Polynoidae, Phyllodocidae, Terebellidae, Serpulidae and Sabellidae, account for most of the diversity, as is the case in along the French Continental shelf (Dauvin *et al.*, 2006), the Greek coasts (Faulwetter *et al.*, 2017), the

Turkish coasts (Çinar *et al.*, 2014), and Adriatic coastline (Mikac, 2015); however, in these areas, there is also the significant presence of the family Maldanidae.

The percentage of questionable species and species complexes remains high in the case of studies along the Algerian coastline (15%), but this number is lower than that given by Faulwetter *et al.* (2017) for such types of species present in Greek waters (23%).

Arvanitidis *et al.* (2002) reviewed 1,036 species of polychaetes for the Mediterranean Sea, including 41% that are considered as cosmopolitan, 29% as Atlantic-Mediterranean and 19% as endemic polychaetes. By comparison, the Mediterranean, European and African Atlantic species are dominant along the Algerian coastal waters accounting for 60%. The European Atlantic-Mediterranean species (38%) and the cosmopolitan species (12%) are the dominant groups on the Algerian coasts. The number of endemic species for Algeria is low (24 species, making up just 5% of the recorded species and indeed, lower than the values reported for other areas of the Mediterranean Sea such as the French Mediterranean coast (Dauvin *et al.*, 2006), the Greek coasts (Simboura & Nicolaidou, 2001) and the Aegean Sea (Arvanitidis *et al.*, 2002).

The close similarity between the Algerian polychaetes and those found in both the European and African coasts of the Atlantic Ocean reflects the influence of the Atlantic waters along the Moroccan coasts extending towards Tunisia in the south of the Mediterranean Sea, which is inevitably related to the connexion via the Strait of Gibraltar (Fig. 6). This same observation has previously been highlighted for all the macrobenthic species of the Algerian coasts (Dauvin *et al.*, 2013). Moreover, the polychaete fauna in Algerian waters is similar to those of the North-Western basin of the Mediterranean Sea off Spain, France and Italy (Fig. 6). Furthermore, Algerian polychaete fauna displays a great similarity to that of the Aegean Sea (both Greek and Turkish coasts), suggesting a high level of similarity of Polychaete fauna at the scale of the Mediterranean Sea. The Black Sea, due its particular physico-chemical characteristics shows little similarity in terms of polychaete fauna with the different areas of the Mediterranean Sea.

Faulwetter *et al.* (2017) pointed out that the regional lists of species inevitably reflect the research and sampling effort. He added that their reliability depends on the presence of zoological experts who are competent in the identification of polychaetes, noting that some groups or species of polychaetes can be very difficult to identify (Dauvin, 2005). The richness and geographic origin of a species in a given area can be estimated by making comparisons. Faulwetter *et al.* (2017) stressed that each inventory carried out on Polychaetes has given rise to a relatively large number of species reported in the same region. Faulwetter *et al.* (2017) go on to explain that this may be partly due by the actual geographic distribution of species and partly due to the incorrect identification of some species.

Comprehensive revisions and updated identification keys are lacking for many of the taxa studied in the Medi-

terranean yet protocols established a century ago, such as those of Fauvel (1923, 1927a), are still commonly used in many laboratories as the main tools for species identification. It is unfortunate that the level of research on Mediterranean Polychaete Fauna performed in the 1990s was not maintained to the present day. The taxonomic effort remains to be implemented and will be a challenge for polychaete experts around the world. On the other hand, British Synopses, Fauna Iberica and other publications on the taxonomy and phylogeny of polychaetes remain very useful tools for the identification of the Mediterranean polychaetes. Furthermore, molecular analysis needs to be developed to resolve the problems of cryptic and sibling polychaete species, not only for the Mediterranean Sea but also for the wider area of the North-Eastern Atlantic Ocean. The World Register of Marine Species (WoRMS) has become an indispensable tool, not only for naming existing species and problems of synonymy, but also for describing their actual geographical distribution.

The Mediterranean Sea is recognised as a rich area for biodiversity. It is also impacted on by a range of damaging factors such as habitat loss and degradation, climate change, pollution and the invasion of NIS (Coll *et al.*, 2010, 2012; Altobelli *et al.*, 2017). A regular evaluation of the marine biodiversity of target groups (such as the polychaetes) in certain target areas (such as the wide range of soft-bottom habitats in the Bay of Bou Ismail) is strongly recommended. Such monitoring activity can reveal the long-term changes in biodiversity under the increased influence of climatic and human pressures in Algerian coastal environments.

The analyses by Arvanitidis *et al.* (2002) show differences in the Mediterranean Sea between the western basin, where the polychaete studies are satisfactory, and the eastern basin where the knowledge of polychaetes remains insufficient. Furthermore, Spanish, French and Italian inventories cover the northern coasts of the western basin, whereas there is relatively sparse data for the southern coast (North Africa) of this same basin. For the central part of the Mediterranean Sea, these inventories take into account the Ionian Sea (Italy and Greece). Finally, for the eastern basin, the inventories carried out concern mostly the Aegean Sea (Ergen, 1976; Simboura, 1987; Arvanitidis, 1994, 2000), the Levantine Sea, mainly the coasts of Cyprus and Israel (Ben-Eliahu, 1972, 1991, 1995; Ben-Eliahu & Fiege, 1995, 1996; Russo, 1997), the Egyptian coasts (Abd-Elnaby, 1999; Selim, 1978, 1996) and Turkish waters (Ergen & Çinar, 1997). The data relating to these areas remain sporadic.

Since the beginning of new millennium there has been a considerable research effort on polychaetes with a great deal of effort targeted at those areas with a low level of data: Algeria (Bakalem, 2008; Grimes, 2010), Tunisia (Ayari *et al.*, 2009; Zaâbi *et al.*, 2012; Ayari *et al.*, in preparation), Greece (see Faulwetter, 2017), Turkey (see Çinar *et al.*, 2014), Cyprus (Çinar, 2005), and Egypt (Abd-Elnaby, 2008, 2009; Dorgham *et al.*, 2013, 2014). These very recent results have shown that the diversity of polychaete fauna is relatively homogenous at the scale of the whole Mediterranean Sea and that the differences between the

West and East (as noted by Arvanitidis *et al.*, 2002) may only be due to the lack of information and thus not correctly reflect the real situation. Future research using molecular analysis will be crucial to assess the representability of questionable species and species complex, which are numerous amongst the polychaete species reported.

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