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The Atlantic–Mediterranean ecological connection: a study on decapod larval communities

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Supplementary Material

The Atlantic–Mediterranean ecological connection: a study on decapod larval communities

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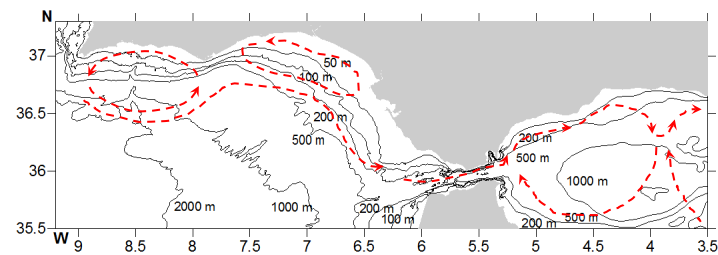


Fig. S1: Simplified scheme of the main surface circulation in the northern shelves of the Gulf of Cadiz and Alboran Sea based on García-Lafuente *et al.* (2006).

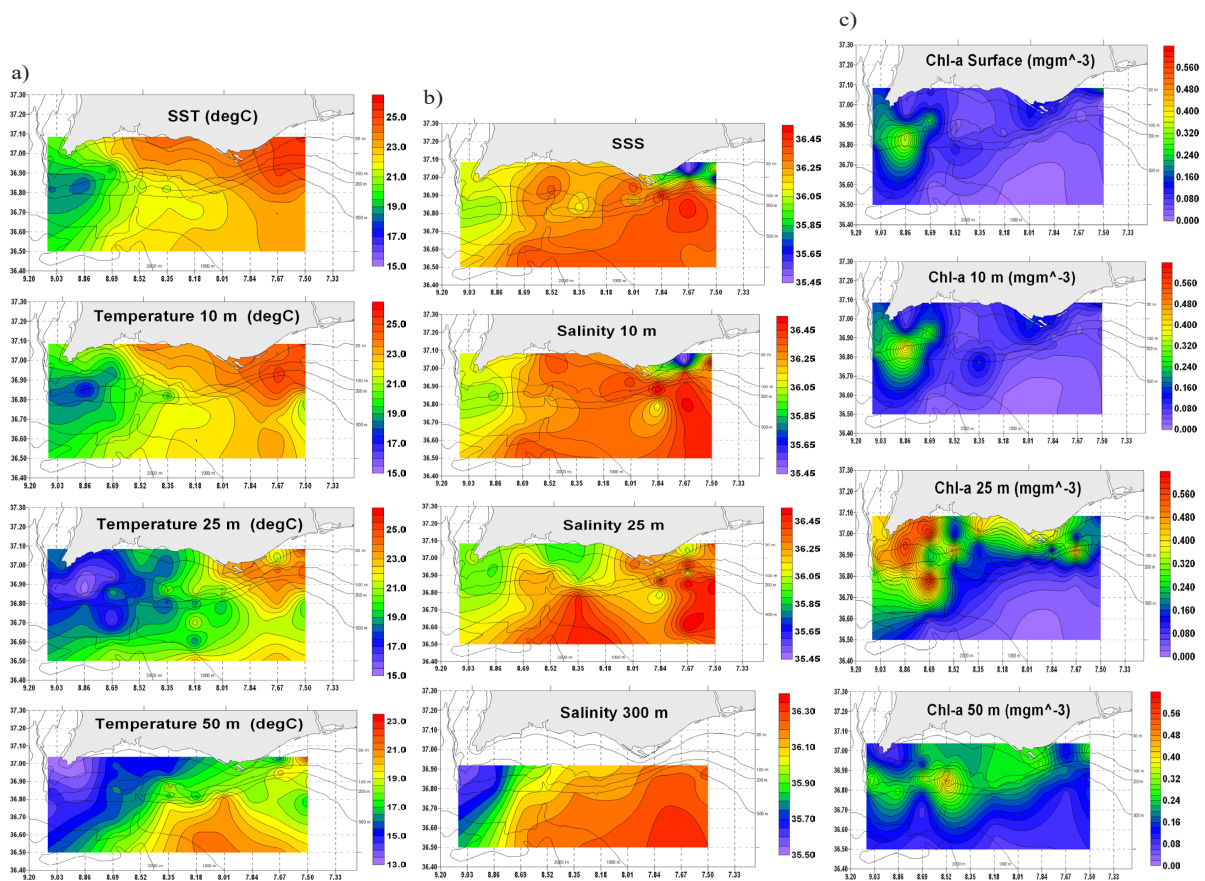


Fig. S2: Physical parameters for the Algarve sampling area: a) temperature (°C), b) salinity and c) chlorophyll-a (mg.L⁻¹) at surface (1st panel), and at 10 m (2nd panel), 25 m (3rd panel) and 50/300 m (4th panel) depth.

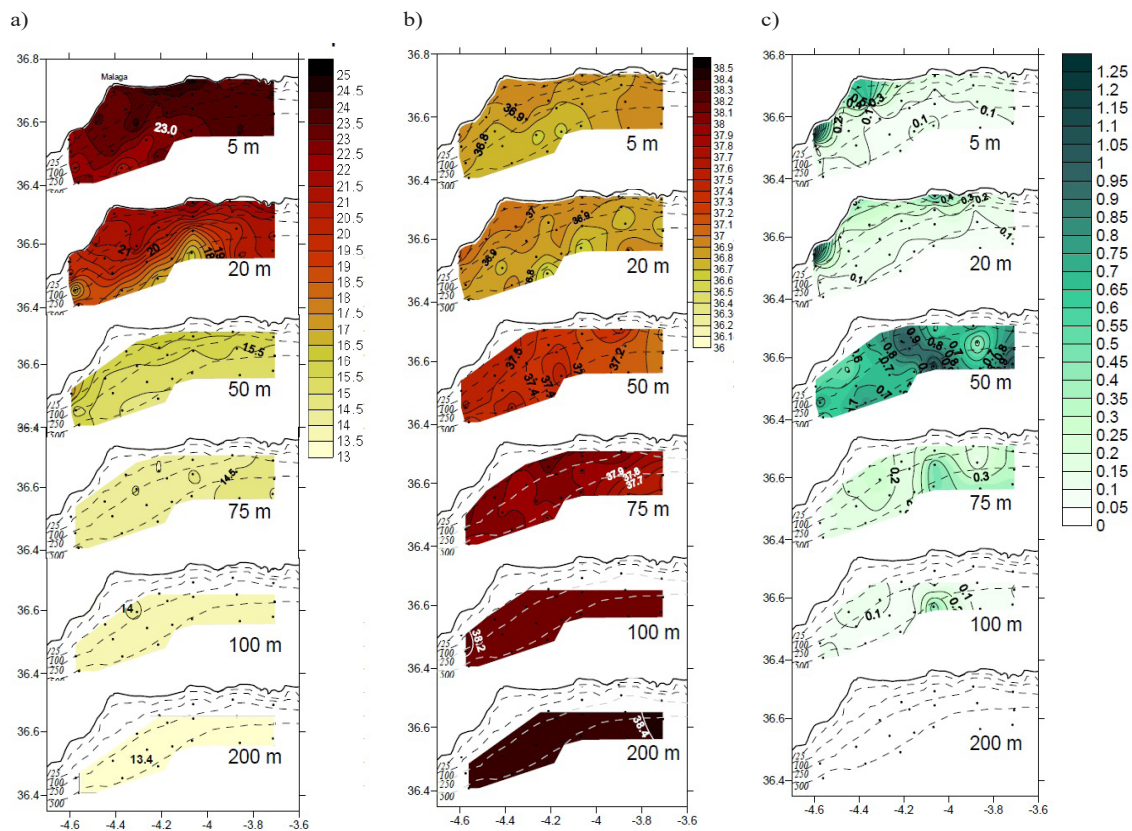


Fig. S3: Physical parameters for the Alboran sampling area: a) temperature (°C), b) salinity and c) chlorophyll-a (mg.L⁻¹) at surface (5m) to 200 m depth. The small black dots represent the sampling sites. Modified from Macías *et al.* (2011).

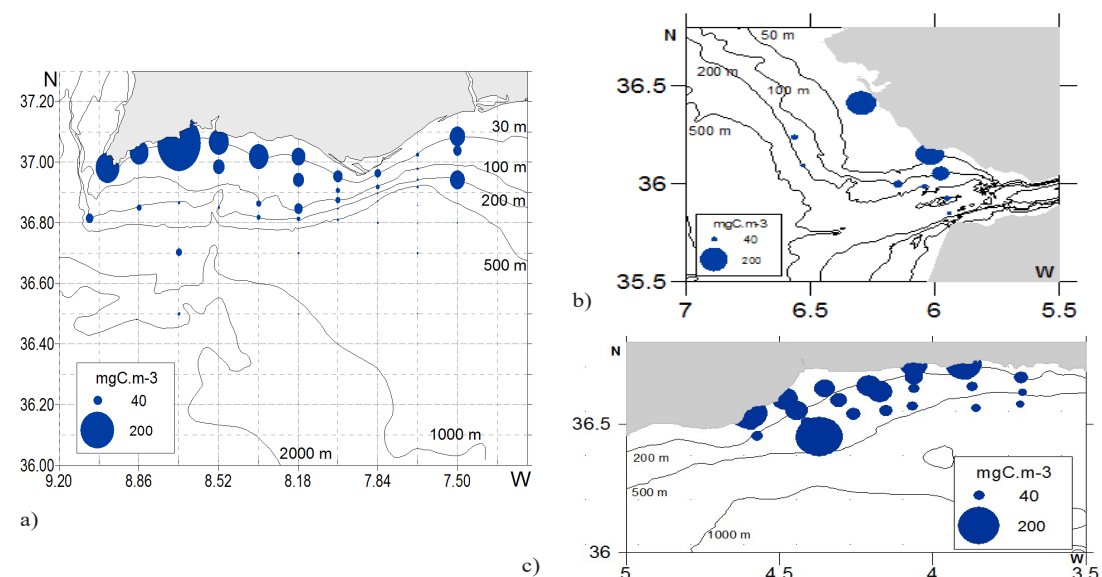


Fig. S4: Spatial data for zooplankton biomass (mg C.m⁻³) for each sampling area: a) Algarve shelf detail (area I in Fig. 1a); b) Strait of Gibraltar detail (area II in Fig. 1a); c) northern Alboran detail (area III in Fig. 1a).

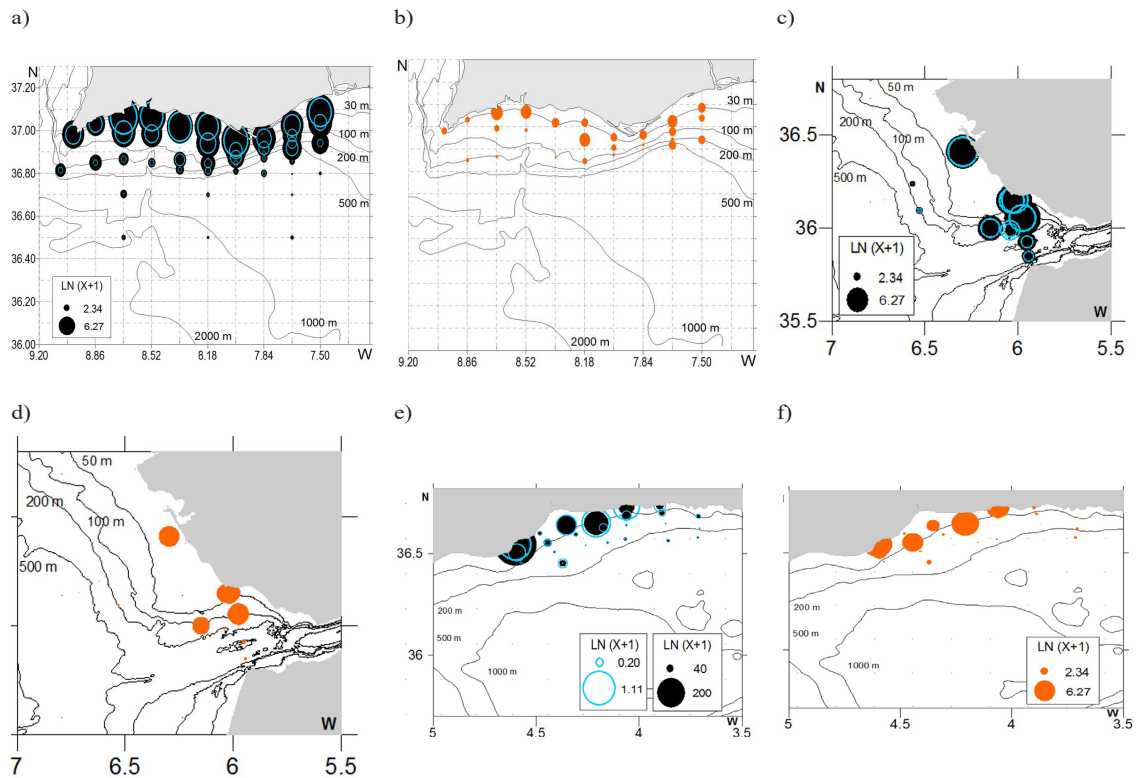


Fig. S5: Spatial data for the total larval abundance ($\ln [x + 1]$ where $x = \text{ind.} 10 \text{ m}^{-3}$) in Algarve (a, b), Gibraltar (c, d) and Alboran (e, f) sampling areas. Data refers to the abundance of all zoal stages (black bubbles) and first larval stage (blue bubbles) [a, c, e], and megalopae/decapodid stage (orange bubbles) [b, d, f]. The same scale applies when only one is presented for each area.

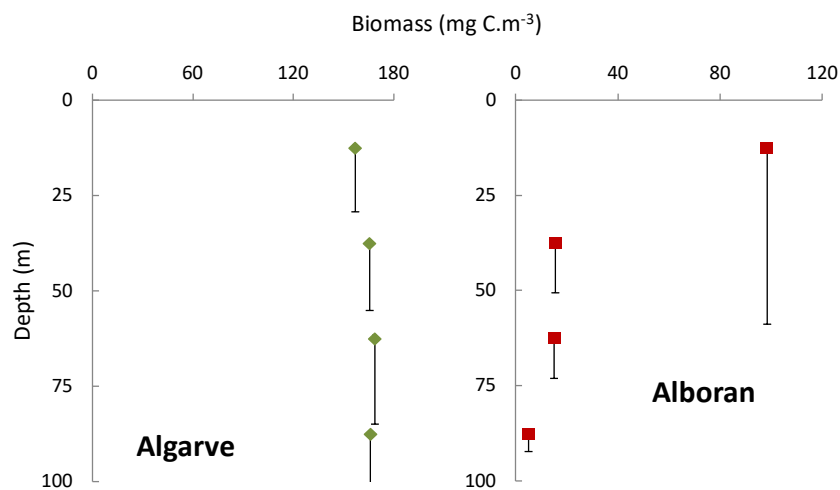


Fig. S6: Vertical biomass values (mg C.m^{-3}) by each sampling area (diamond - Algarve, LHPR data; square - Alboran). Data refer to values registered in each depth interval of the water column.

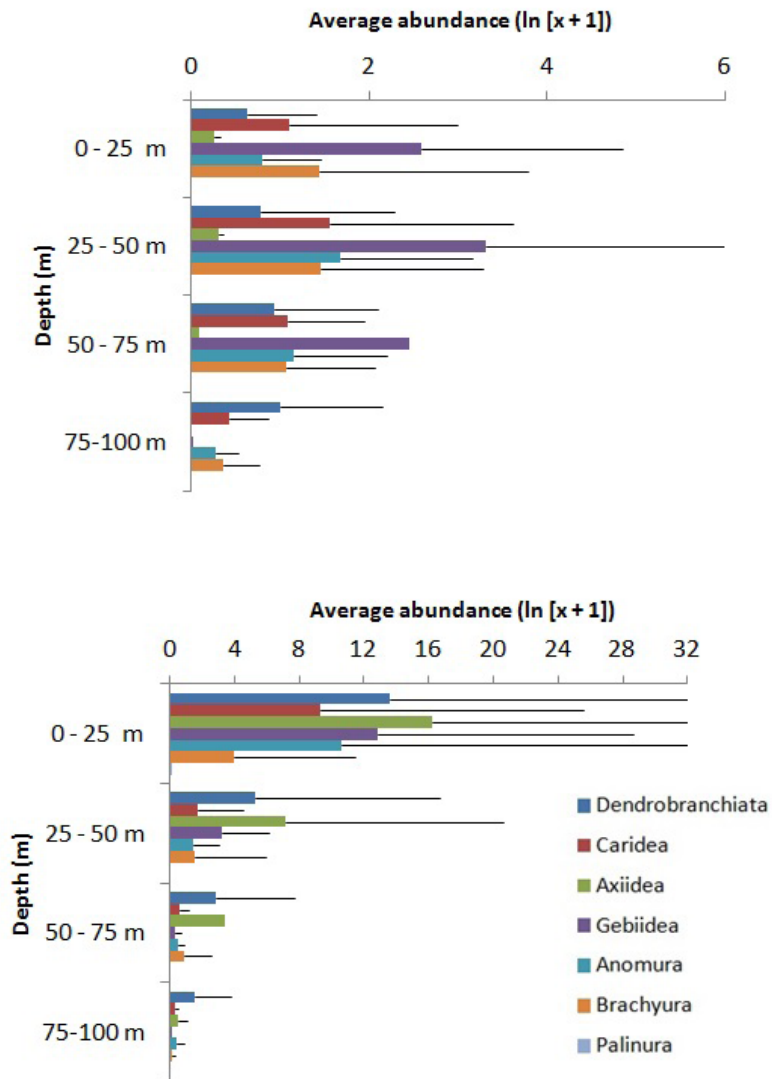


Fig. S7: Average vertical abundance (ln [x + 1] where x = ind.10 m⁻³) of decapod larvae grouped according to their respective infra-order by sampling location (Algarve area - LHPR data).

Table S1. Number of decapod larvae (N), frequency of occurrence (F) and average abundance (A) in the water column (number of larvae $10\text{ m}^{-3} \pm \text{SD}$) for the different taxa registered in the Algarve, Strait of Gibraltar and Alboran Sea samples. Captured stages (D - decapodid, M – megalopa), adult habitats and the number of stages in the larval cycle are also presented for each taxa (in the case of Dendrobranchiata shrimps, the first 3 stages correspond to protozoas).

Taxa	Larval cycle	Adults habitat	Stages	N	F (%)	A ± SD	Stages	N	F (%)	A ± SD	Stages	N	F (%)	A ± SD
Dendrobranchiata (Shrimps)														
<i>Aristeus antennatus</i>	Long	Oceanic epibenthic	II	1	0.002	0.0004 ± 0.003	-	-	-	-	-	-	-	-
<i>Gennadas elegans</i>	Long	Mesopelagic	I-VI	66	0.14	0.07 ± 0.12	-	-	-	-	I-VII	1774	8.97	1.04 ± 0.69
<i>Gennadas</i> spp.	Long	Mesopelagic	III	4	0.01	0.002 ± 0.02	II	1	0.005	0.01 ± 0.03	I	1	0.01	0.001 ± 0.006
<i>Melicerus kerathurus</i>	Long	Coastal	I-III,V-VII, D	73	0.15	0.03 ± 0.17	II, III, V, D	20	0.10	0.10 ± 0.25	-	-	-	-
Benthescymidae n.id.	-	-	II	1	0.002	0.0004 ± 0.003	-	-	-	-	-	-	-	-
<i>Parapenaeus longirostris</i>	Long	Oceanic epibenthic	I-IV	23	0.05	0.02 ± 0.09	I, II	3	0.02	0.04 ± 0.11	V	1	0.01	0.003 ± 0.014
<i>Penaeopsis serrata</i>	Long	Coastal	IV, VI, VII	6	0.01	0.007 ± 0.04	-	-	-	-	-	-	-	-
<i>Penaeopsis</i> spp.	Long	Coastal	IV, V, VII	3	0.01	0.01 ± 0.05	-	-	-	-	V	1	0.01	0.002 ± 0.01
<i>Aristaeopsis</i> spp.	Long	Oceanic epibenthic	I-VI	24	0.05	0.02 ± 0.13	-	-	-	-	-	-	-	-
<i>Marsupenaeus japonicus</i>	Long	Oceanic epibenthic	IV	1	0.002	0.002 ± 0.01	-	-	-	-	-	-	-	-
Penaeidae n.id.	-	-	I, II, VI	3	0.01	0.01 ± 0.03	-	-	-	-	-	-	-	-
<i>Sicyonia carinata</i>	Long	Oceanic epibenthic	II-V	13	0.03	0.02 ± 0.08	I-III, V	11	0.05	0.1 ± 0.23	III-V	7	0.04	0.03 ± 0.06
<i>Solenocera membranacea</i>	Long	Oceanic epibenthic	I-VIII	300	0.63	0.2 ± 0.3	II-IV	9	0.04	0.1 ± 0.13	I-VII	399	2.02	0.45 ± 0.45
<i>Eusergestes arcticus</i>	Long	Mesopelagic	I-IV	14	0.03	0.004 ± 0.02	I	1	0.01	0.01 ± 0.03	I-V, D	486	2.46	0.22 ± 0.35
<i>Sergestes atlanticus</i>	Long	Epipelagic	II-V	32	0.07	0.03 ± 0.08	-	-	-	-	III	1	0.01	0.01 ± 0.04
<i>Deosergestes corniculatus</i>	Long	Epipelagic	I-III, V	50	0.11	0.03 ± 0.08	III	1	0.01	0.01 ± 0.02	III, IV	3	0.02	0.005 ± 0.014
<i>Sergestes henseni</i>	Long	Mesopelagic	I, III, V	4	0.01	0.01 ± 0.02	-	-	-	-	II-V	19	0.1	0.04 ± 0.08
<i>Sergestes cornutus</i>	Long	Mesopelagic	D	3	0.01	0.0003 ± 0.002	-	-	-	-	-	-	-	-
<i>Parasergestes vigilax</i>	Long	Epipelagic	II-V	6	0.01	0.01 ± 0.04	-	-	-	-	-	-	-	-
<i>Alloisergestes sargassi</i>	Long	Mesopelagic	II, IV, V, D	28	0.06	0.01 ± 0.04	-	-	-	-	-	-	-	-
<i>Alloisergestes pectinatus</i>	Long	Mesopelagic	D	22	0.05	0.004 ± 0.01	-	-	-	-	-	-	-	-
<i>Sergestes</i> spp.	Long	Epipelagic	I-III	20	0.04	0.01 ± 0.04	-	-	-	-	II, V, D, J	25	0.13	0.02 ± 0.04
<i>Sergia robusta</i>	Long	Mesopelagic	II-V, D	51	0.11	0.02 ± 0.04	-	-	-	-	I-V, D	211	1.07	0.13 ± 0.2
Sergestidae n.id.	-	-	I, III, D	66	0.14	0.01 ± 0.01	D	1	0.01	0.02 ± 0.05	-	-	-	-
<i>Lucifer</i> spp.	Long	Epipelagic	D	2	0.004	0.0002 ± 0.002	-	-	-	-	I, II	2	0.01	0.002 ± 0.01

(continued)

Table S1 continued

Taxa	Larval cycle	Adults habitat	Stages	N	F (%)	A ± SD	Stages	N	F (%)	A ± SD	Stages	N	F (%)	A ± SD
Caridea (Caridean shrimps)														
<i>Stenopus spinosus</i>	Long	Cosmopolite	I	2	0.004	0.001 ± 0.01	-	-	-	-	-	-	-	-
<i>Nematocarcinus</i> spp.	Long	Mesopelagic	I	1	0.002	0.001 ± 0.004	-	-	-	-	-	-	-	-
<i>Acanthephyra</i> spp.	Long	Cosmopolite	II-VI, IX	13	0.03	0.01 ± 0.02	-	-	-	-	III	1	0.01	0.001 ± 0.006
<i>Pasiphaea sivado</i>	Medium	Cosmopolite	I-IV, D, J	159	0.33	0.02 ± 0.06	-	-	-	-	-	-	-	-
<i>Pasiphaea multidentata</i>	Medium	Cosmopolite	-	-	-	-	-	-	-	-	D, J	3	0.02	0.002 ± 0.01
<i>Pasiphaeidae</i> n.id.	-	-	IV	1	0.002	0.003 ± 0.02	-	-	-	-	-	-	-	-
<i>Rhynchocinetidae</i> n.id.	-	-	-	-	-	-	-	-	-	-	I	1	0.01	0.002 ± 0.01
<i>Palaemon elegans</i>	Long	Intertidal	I-VIII	20	0.04	0.04 ± 0.15	III	1	0.01	0.02 ± 0.05	-	-	-	-
<i>Palaemon serratus</i>	Long	Intertidal	I, III, IV	4	0.01	0.01 ± 0.04	I, IX	2	0.01	0.05 ± 0.13	-	-	-	-
<i>Palaemon longirostris</i>	Long	Intertidal	II-V	8	0.02	0.02 ± 0.07	II-V	4	0.02	0.03 ± 0.08	-	-	-	-
<i>Palaemonetes varians</i>	Long	Intertidal	I	1	0.002	0.001 ± 0.004	-	-	-	-	-	-	-	-
<i>Palaemon</i> spp.	Long	Intertidal	I-VIII	13	0.03	0.03 ± 0.08	-	-	-	-	I, II, V	4	0.02	0.02 ± 0.05
<i>Pontonia</i> spp.	Long	Coastal	II, IV	10	0.02	0.02 ± 0.07	-	-	-	-	II-V	5	0.03	0.01 ± 0.03
<i>Pontoniinae</i> n.id.	-	Coastal	I, II, V	72	0.15	0.1 ± 0.3	I	5	0.02	0.05 ± 0.1	-	-	-	-
<i>Pontoniinae</i> n.id. type Mesocaris	-	-	-	-	-	-	VIII	1	0.01	0.02 ± 0.05	-	-	-	-
<i>Periclimenes</i> spp.	Long	Coastal	II-IV, VI, VII, IX	21	0.04	0.03 ± 0.07	II-IX	25	0.13	0.07 ± 0.24	V, VIII	3	0.02	0.005 ± 0.02
<i>Athanas nitescens</i>	Long	Coastal	I-IX, D	1133	2.38	0.27 ± 0.68	I-IX, D	245	1.16	1.13 ± 1.22	I-VIII, D	318	1.61	0.2 ± 0.5
<i>Alpheus glaber</i>	Long	Cosmopolite	II-IX	852	1.79	0.54 ± 0.71	I-IX	521	2.47	1.57 ± 1.18	I-IX, D	764	3.86	0.81 ± 0.97
<i>Alpheus</i> spp.	Long	Cosmopolite	I-IX, D	226	0.47	0.07 ± 0.25	II-IV, VI-IX, D	44	0.21	0.28 ± 0.44	I-IX, J	259	1.31	0.17 ± 0.51
<i>Alpheidae</i> n.id.	-	-	I, II, V-IX	62	0.13	0.09 ± 0.3	I-III, VI-IX	46	0.23	0.19 ± 0.55	-	-	-	-
<i>Eualus cranchii</i>	Long	Coastal	I-IX	1198	2.52	0.57 ± 0.99	I-IX	1066	5.05	1.46 ± 1.93	IV, V	4	0.02	0.01 ± 0.03
<i>Eualus ocellus</i>	Long	Coastal	I-IX	225	0.47	0.17 ± 0.45	I-IX	1074	5.08	1.62 ± 1.5	-	-	-	-
<i>Eualus</i> spp.	Long	Coastal	-	-	-	-	I-IX	30	0.14	0.26 ± 0.47	I-IX	211	1.07	0.37 ± 0.6
<i>Hippolyte</i> spp.	Long	Coastal	I-VI	30	0.06	0.04 ± 0.2	I-V	1152	5.45	1.36 ± 1.87	I, II, V-VII, D	12	0.06	0.01 ± 0.04
<i>Lysmata</i> spp.	Long	Intertidal	I-VI, IX	70	0.15	0.07 ± 0.14	I-III, V-VII, IX	64	0.3	0.03 ± 0.1	II, V, VI, VIII	10	0.05	0.01 ± 0.02
<i>Lysmata seticaudata</i>	Long	Intertidal	-	-	-	-	II-VII, IX	1	0.18	0.05 ± 0.13	II-VI, IX	17	0.09	0.03 ± 0.09

(continued)

Table S1 continued

Taxa	Larval cycle	Adults habitat	Stages	Algarve			Gibraltar			Alboran				
				N	F (%)	A ± SD	Stages	N	F (%)	A ± SD	Stages	N	F (%)	A ± SD
<i>Lysmata</i> spp type "Bourdillon-Casanova"	Long	Intertidal	-	-	-	-	I	4	0.02	0.22 ± 0.5	-	-	-	-
Hippolytidae n.id.	-	Coastal	I-IX, D	50	0.11	0.02 ± 0.1	I-IV, VI, VII, D	19	0.09	0.46 ± 0.45	-	-	-	-
Hippolytidae n.id. type A	-	-	IV-VIII	12	0.03	0.01 ± 0.03	-	-	-	-	-	-	-	-
<i>Processa edulis crassipes</i>	Long	Intertidal	II-VIII	122	0.26	0.15 ± 0.33	III, VI, IX	3	0.02	0.02 ± 0.04	-	-	-	-
<i>Processa edulis edulis</i>	Long	Intertidal	II-VIII	212	0.45	0.16 ± 0.44	II-VII, IX	40	0.19	0.34 ± 0.41	I-VIII	466	2.36	0.42 ± 0.88
<i>Processa modica carolii</i>	Long	Coastal	I-IX	396	0.83	0.3 ± 0.62	I-IX	61	0.29	0.37 ± 0.59	I-IX	205	1.04	0.29 ± 0.68
<i>Processa modica modica</i>	Long	Coastal	I-VII	700	1.47	0.46 ± 0.86	IV-VII	10	0.05	0.12 ± 0.23	-	-	-	-
<i>Processa canaliculata</i>	Long	Oceanic epibenthic	I, III	10	0.02	0.01 ± 0.04	I	1	0.01	0.01 ± 0.03	II	1	0.01	0.002 ± 0.013
<i>Processa macrodactyla</i>	Long	Coastal	-	-	-	-	-	-	-	-	I-VII, IX	83	0.42	0.13 ± 0.51
<i>Processa nouveli holthuisi</i>	Long	Coastal	III-IX	203	0.43	0.11 ± 0.31	IV, VI, VII, IX	40	0.19	0.24 ± 0.47	-	-	-	-
<i>Processa nouveli nouveli</i>	Long	Coastal	II-IX	364	0.76	0.27 ± 0.43	II-IX	113	0.53	0.69 ± 0.73	I-IX, D	867	4.38	0.66 ± 0.98
<i>Processa ? elegantula</i>	Long	Coastal	-	-	-	-	-	-	-	-	VIII, IX	22	0.11	0.03 ± 0.16
<i>Processa nouveli</i>	Long	Coastal	-	-	-	-	II, III	8	0.04	0.18 ± 0.52	-	-	-	-
<i>Processa</i> spp.	Long	Oceanic epibenthic	I-IX, D	2996	6.29	0.48 ± 0.995	I-IX, D	1223	5.79	1.74 ± 1.71	I-IX, D, J	275	1.39	0.17 ± 0.5
<i>Processa</i> sp. 2	Long	-	-	-	-	-	-	-	-	-	VI, VII, IX	3	0.02	0.001 ± 0.01
<i>Plesionika</i> spp.	Long	Coastal	I-IX	221	0.46	0.14 ± 0.22	I-V	98	0.46	0.61 ± 0.52	I-V	49	0.25	0.09 ± 0.13
<i>Pandalina brevirostris</i>	Long	Coastal	I-VII	219	0.46	0.08 ± 0.32	I-VII	96	0.45	0.51 ± 0.67	I-VII, D	50	0.25	0.04 ± 0.08
<i>Stylopandalus</i> spp.	Long	Coastal	-	-	-	-	-	-	-	-	II-IX	58	0.29	0.09 ± 0.11
Pandalidae n.id.	-	-	I-VII, IX	92	0.19	0.04 ± 0.18	I, II, IV, VIII, IX	10	0.05	0.15 ± 0.22	I-III, V, D, J	10	0.05	0.006 ± 0.03
Pandalidae n.id. type A	-	-	III-V	4	0.01	0.01 ± 0.04	-	-	-	-	-	-	-	-
<i>Aegaeon</i> spp.	Medium	Cosmopolite	I-III, V, VI, IX, D	41	0.09	0.03 ± 0.13	I-III, VI, VII	9	0.05	0.05 ± 0.14	III-V	3	0.02	0.02 ± 0.06
<i>Pontophilus spinosus</i>	Long	Coastal	I-III	11	0.02	0.02 ± 0.15	-	-	-	-	I, II	6	0.03	0.005 ± 0.04
<i>Crangon crangon</i>	Medium	Coastal	D	1	0.002	0.001 ± 0.01	-	-	-	-	-	-	-	-
<i>Philocheras bispinosus bispinosus</i>	Medium	Coastal	I-V	511	1.07	0.12 ± 0.38	I-V	19	0.1	0.08 ± 0.23	I-V, D	1171	5.92	0.33 ± 0.79

(continued)

Table S1 continued

Taxa	Larval cycle	Adults habitat	Stages	Algarve			Stages	Gibraltar			Stages	Alboran		
				N	F (%)	A ± SD		N	F (%)	A ± SD		N	F (%)	A ± SD
<i>Philocheras hispidus neglectus</i>	Medium	Coastal	I-V	46	0.1	0.1 ± 0.23	I-V	304	1.44	0.98 ± 1.39	II-V	21	0.11	0.05 ± 0.15
<i>Philocheras hispidus</i>	Medium	Coastal	-	-	-	-	-	-	-	-	III, D	4	0.02	0.001 ± 0.006
<i>Philocheras echinulatus</i>	Medium	Oceanic epibenthic	IV, V	5	0.01	0.01 ± 0.07	I, IV, V	16	0.08	0.12 ± 0.29	-	-	-	-
<i>Philocheras fasciatus</i>	Medium	Intertidal	V	1	0.002	0.004 ± 0.03	I, II, IV	4	0.02	0.04 ± 0.12	-	-	-	-
<i>Philocheras sculptus</i>	Medium	Coastal	I-V, D	49	0.1	0.03 ± 0.13	I-V	287	1.36	0.8 ± 1.2	I	1	0.01	0.002 ± 0.009
<i>Philocheras</i> spp.	Medium	Oceanic epibenthic	I-V, D	991	2.08	0.24 ± 0.58	I-V, D	111	0.56	0.36 ± 1.3	I, II, IV, V, D	22	0.11	0.02 ± 0.1
Axiidea, Gebiidea (Ghost shrimps)														
<i>Callinassa tyrrenha</i>	Medium	Endobenthic	I-III	7	0.01	0.02 ± 0.1	-	-	-	-	I-IV	25	0.13	0.12 ± 0.37
<i>Callinassa truncata</i>	Medium	Endobenthic	I	1	0.002	0.002 ± 0.01	-	-	-	-	I-IV, D	3589	18.14	1.1 ± 1.4
<i>Callinassa subterranea</i>	Medium	Endobenthic	-	-	-	-	-	-	-	-	I-III	8	0.04	0.02 ± 0.05
<i>Callinassidae</i> SL16	Medium	Endobenthic	II	1	0.002	0.0004 ± 0.003	II	2	0.01	0.01 ± 0.03	I	1	0.01	0.001 ± 0.007
<i>Callinassidae</i> L17	Medium	Endobenthic	I, II	4	0.01	0.01 ± 0.05	I, II	10	0.01	0.16 ± 0.44	-	-	-	-
<i>Callinassidae</i> n.id.	-	-	III, D	2	0.004	0.001 ± 0.006	II	1	0.05	0.03 ± 0.09	II-IV	6	0.03	0.02 ± 0.07
<i>Jaxea nocturna</i>	Medium	Endobenthic	I-IV	54	0.11	0.08 ± 0.18	-	-	-	-	I-VI	46	0.23	0.14 ± 0.28
<i>Upogebia pusilla</i>	Medium	Endobenthic	I-IV	6104	12.82	1.18 ± 1.53	I-IV	1435	6.79	2.09 ± 1.81	I-IV	623	3.15	0.46 ± 0.85
<i>Upogebia deltaura</i>	Medium	Endobenthic	I-IV	5615	11.79	0.91 ± 1.58	I-IV	2529	11.97	2.34 ± 2.16	I-IV	547	2.77	0.56 ± 1.07
<i>Upogebia</i> spp.	Medium	Endobenthic	III, IV, D	102	0.21	0.03 ± 0.1	I, II, IV, D	14	0.05	0.16 ± 0.31	D	7	0.04	0.006 ± 0.03
Scyllaridae (Slipper lobsters)														
<i>Scyllarus</i> spp.	Very long	Coastal	I, II, IV, V, VII	25	0.05	0.03 ± 0.07	I, II, VI	4	0.02	0.03 ± 0.05	IV	1	0.01	0.001 ± 0.006
Paguridae, Diogenidae (Hermit crabs)														
<i>Clibanarius erythropus</i>	Medium	Intertidal	I, II	185	0.39	0.1 ± 0.3	I	2	0.01	0.06 ± 0.13	-	-	-	-
<i>Paguristes eremita</i>	Medium	Cosmopolite	I, III	5	0.01	0.01 ± 0.08	-	-	-	-	-	-	-	-
<i>Dardanus arrosor</i>	Medium	Coastal	I, III	2	0.004	0.002 ± 0.01	I	3	0.01	0.04 ± 0.07	I, II	27	0.14	0.05 ± 0.08
<i>Diogenes pugilator</i>	Medium	Intertidal	I-V, M	9217	19.36	0.6 ± 1.35	I-V, M	2543	12.04	2.66 ± 3.21	I-V, M	3719	18.8	0.63 ± 1.29
<i>Calcinus tubularis</i>	Medium	Intertidal	I, II	30	0.06	0.05 ± 0.19	I	3	0.02	0.11 ± 0.2	I-III	95	0.48	0.16 ± 0.26
<i>Pagurus</i> spp.	Medium	Cosmopolite	I-IV, M	1296	2.72	0.26 ± 0.7	I-IV, M	775	3.67	2.11 ± 1.81	I-IV, M	109	0.55	0.12 ± 0.31
<i>Nematopagurus longicornis</i>	Medium	Oceanic epibenthic	I, III, IV	3	0.01	0.002 ± 0.01	I	4	0.02	0.04 ± 0.08	II	3	0.02	0.006 ± 0.02
<i>Spiropagurus elegans</i>	Medium	Coastal	I	2	0.004	0.01 ± 0.04	I	1	0.01	0.03 ± 0.09	-	-	-	-

(continued)

Table S1 continued

Taxa	Larval cycle	Adults habitat	Stages	Algarve			Gibraltar			Alboran				
				N	F (%)	A ± SD	Stages	N	F (%)	A ± SD	Stages	N	F (%)	A ± SD
<i>Anapagurus</i> spp.	Medium	Cosmopolite	I-IV, M	673	1.41	0.16 ± 0.48	I-IV, M	462	2.19	1.08 ± 1.52	I-IV, M	511	2.58	0.24 ± 0.66
<i>Parapagurus pilosimanus</i>	Medium	Cosmopolite	I-III	5	0.01	0.003 ± 0.01	-	-	-	-	-	-	-	-
<i>Parapagurus</i> spp.	Medium	Cosmopolite	II-IV	5	0.01	0.003 ± 0.01	-	-	-	-	-	-	-	-
Paguridae n.id.	-	Cosmopolite	M	1	0.002	0.0004 ± 0.003	-	-	-	-	-	-	-	-
Paguridae n.id. type ASM3	-	-	I, II, IV	5	0.01	0.002 ± 0.008	-	-	-	-	-	-	-	-
Galatheidæ (Squat lobsters)														
<i>Galathea dispersa</i>	Medium	Coastal	I-V	337	0.71	0.23 ± 0.51	I-V	761	3.6	1.3 ± 1.34	-	-	-	-
<i>Galathea intermedia</i>	Medium	Coastal	I-V	158	0.33	0.15 ± 0.37	I-V	550	2.6	0.73 ± 1.32	-	-	-	-
<i>Galathea nexa</i>	Medium	Coastal	-	-	-	-	I-III, V	19	0.09	0.12 ± 0.28	-	-	-	-
<i>Galathea squamifera</i>	Medium	Coastal	I	1	0.002	0.001 ± 0.004	I-III, V	27	0.13	0.22 ± 0.5	-	-	-	-
<i>Galathea strigosa</i>	Medium	Coastal	-	-	-	-	III	1	0.01	0.03 ± 0.09	-	-	-	-
<i>Galathea</i> S22	Medium	-	I-IV	67	0.14	0.05 ± 0.09	I	11	0.05	0.08 ± 0.12	I-III	14	0.07	0.03 ± 0.06
<i>Galathea</i> FSL21	Medium	-	I-III	8	0.02	0.18 ± 0.29	-	-	-	-	-	-	-	-
<i>Galathea</i> spp.	Medium	Coastal	I, M	53	0.11	0.02 ± 0.06	I-IV, M	36	0.17	0.41 ± 0.47	I-V, M	111	0.56	0.09 ± 0.26
<i>Manida</i> spp.	Medium	Cosmopolite	-	-	-	-	-	-	-	-	II	1	0.01	0.001 ± 0.006
Brachyura (crabs)														
<i>Pisidia longicornis</i>	Short	Coastal	I, II, M	1274	2.68	0.28 ± 0.8	I, II, M	1275	6.03	1.63 ± 1.92	I, II, M	35	0.18	0.05 ± 0.2
<i>Porcellana platycheles</i>	Short	Coastal	I, II	2	0.004	0.003 ± 0.03	-	-	-	-	II	2	0.01	0.01 ± 0.04
<i>Homola barbata</i>	Long	Cosmopolite	I-III	9	0.02	0.01 ± 0.03	I	1	0.01	0.01 ± 0.03	-	-	-	-
<i>Eithusa mascarone</i>	Medium	Coastal	I-III	8	0.02	0.02 ± 0.09	I	3	0.02	0.15 ± 0.05	I-IV	35	0.18	0.09 ± 0.16
<i>Medorittpe lanata</i>	Medium	Coastal	III	1	0.002	0.001 ± 0.01	I	1	0.01	0.02 ± 0.05	-	-	-	-
<i>Calappa granulata</i>	Medium	Oceanic epibenthic	I-III	98	0.21	0.11 ± 0.19	I, III	46	0.22	0.28 ± 0.48	I-IV	55	0.28	0.1 ± 0.26
<i>Ilia nucleus</i>	Medium	Coastal	-	-	-	-	I	1	0.01	0.06 ± 0.17	I-III	19	0.1	0.05 ± 0.1
<i>Ebalia cranchii</i>	Medium	Oceanic epibenthic	II	1	0.002	0.001 ± 0.008	I	1	0.01	0.01 ± 0.03	I-IV	19	0.1	0.03 ± 0.14
<i>Ebalia nux</i>	Medium	Oceanic epibenthic	I-IV	25	0.05	0.02 ± 0.06	I, II	10	0.05	0.10 ± 0.24	II	1	0.01	0.001 ± 0.01
<i>Ebalia tuberosa</i>	Medium	Oceanic epibenthic	I-IV	10	0.02	0.01 ± 0.04	I-IV	98	0.46	0.49 ± 0.77	II-IV	4	0.02	0.005 ± 0.02
<i>Ebalia tumefacta</i>	Medium	Oceanic epibenthic	I-IV	497	1.04	0.28 ± 0.52	I-III, M	134	0.63	0.54 ± 0.84	I-IV, M	72	0.36	0.11 ± 0.28
<i>Ebalia</i> spp.	Medium	Oceanic epibenthic	M	151	0.32	0.03 ± 0.08	M	20	0.09	0.18 ± 0.3	I-III, M	12	0.06	0.03 ± 0.11
<i>Inachus</i> spp.	Short	Coastal	II, M	16	0.03	0.01 ± 0.02	I, II, M	11	0.06	0.08 ± 0.17	-	-	-	-
<i>Macropodia</i> spp.	Short	Coastal	I, M	3	0.01	0.001 ± 0.01	I, II, M	103	0.52	1.57 ± 3.92	-	-	-	-

(continued)

Table S1 continued

Taxa	Larval cycle	Adults habitat	Algarve			Gibraltar			Alboran		
			Stages	N	F (%)	A \pm SD	Stages	N	F (%)	A \pm SD	A \pm SD
<i>Hyas</i> spp.	Short	Coastal	I	1	0.002	0.0004 \pm 0.003	-	-	-	-	-
<i>Hebisia condyliata</i>	Short	Coastal	I	1	0.002	0.003 \pm 0.02	I, II	9	0.05	0.21 \pm 0.34	-
<i>Pisa</i> spp.	Short	Coastal	I, II, M	6	0.01	0.007 \pm 0.05	I, M	6	0.03	0.11 \pm 0.27	0.005 \pm 0.03
<i>Achaeus cranchii</i>	Short	Coastal	I, II, M	14	0.03	0.007 \pm 0.03	I, II, M	43	0.2	0.49 \pm 0.87	0.033 \pm 0.13
<i>Euryome</i> spp.	Short	Coastal	I, II, M	23	0.05	0.01 \pm 0.06	I, II, M	8	0.04	0.05 \pm 0.13	0.02 \pm 0.11
<i>Acanthonyx tumidatus</i>	Medium	Coastal	-	-	-	-	II	1	0.01	0.03 \pm 0.09	0.002 \pm 0.01
<i>Meja</i> sp.	Short	Coastal	M	1	0.002	0.0001 \pm 0.001	I, II, M	4	0.02	0.06 \pm 0.17	-
Majidae n.id. type "1"	-	-	I, II	81	0.17	0.1 \pm 0.2	I, II	390	1.85	2.05 \pm 2.28	-
<i>Ergasticus clouei</i>	Short	Oceanic epibenthic	I, II	4	0.01	0.002 \pm 0.02	-	-	-	-	-
Majidae n.id.	-	Coastal	II, M	51	0.11	0.01 \pm 0.02	I, II, M	127	0.64	1.84 \pm 3.28	0.01 \pm 0.04
<i>Heterocrypta maltzani</i>	Medium	Coastal	-	-	-	-	-	-	-	-	0.005 \pm 0.03
<i>Parthenope</i> spp.	Medium	Cosmopolite	I-IV, M	326	0.68	0.13 \pm 0.34	I-IV, M	183	0.87	0.6 \pm 0.86	0.02 \pm 0.05
<i>Parthenope</i> ASM16	Medium	-	I-IV	67	0.14	0.07 \pm 0.24	II	1	0.01	0.01 \pm 0.04	-
<i>Parthenope</i> ASM19	Medium	-	I	1	0.002	0.001 \pm 0.01	-	-	-	-	-
<i>Atelecyclus</i> spp.	Medium	Coastal	III-V, M	21	0.04	0.01 \pm 0.07	I-V	20	0.1	0.11 \pm 0.3	0.05 \pm 0.35
Atelecyclidae n.id.	-	-	II-V	6	0.01	0.005 \pm 0.03	-	-	-	-	-
<i>Atelecyclus undecimdentatus</i> ?	Medium	Coastal	III-V	47	0.1	0.05 \pm 0.22	-	-	-	-	-
<i>Primela deniculata</i>	Medium	Coastal	I-III	6	0.01	0.01 \pm 0.09	I-IV	48	0.23	0.23 \pm 0.72	0.005 \pm 0.02
<i>Thia scutellata</i>	Medium	Coastal	I-IV, M	191	0.4	0.11 \pm 0.36	I, II, IV	15	0.07	0.21 \pm 0.31	0.15 \pm 0.38
<i>Corystes cassivelaunus</i>	Medium	Coastal	-	-	-	-	-	-	-	-	0.001 \pm 0.007
Geryonidae n.id.	-	-	-	-	-	-	IV	1	0.01	0.01 \pm 0.02	0.01 \pm 0.05
<i>Sirpus zariqueyi</i>	Medium	Coastal	I-IV	92	0.19	0.09 \pm 0.41	-	-	-	-	0.03 \pm 0.08
<i>Carcinus maenas</i>	Medium	Intertidal	I	3	0.01	0.01 \pm 0.07	-	-	-	-	-
<i>Carcinus aestuarii</i>	Medium	Intertidal	-	-	-	-	-	-	-	-	0.05 \pm 0.22
<i>Portunus latipes</i>	Medium	Coastal	M	4	0.01	0.001 \pm 0.005	-	-	-	-	0.009 \pm 0.04
<i>Bathynectes maravigna</i>	Medium	Coastal	I, II, M	35	0.07	0.02 \pm 0.1	I, II, IV	72	0.34	0.55 \pm 0.85	-
<i>Bathynectes</i> sp.	Medium	Coastal	-	-	-	-	-	-	-	-	0.09 \pm 0.32
<i>Macropipus tuberculatus</i>	Medium	Coastal	-	-	-	-	-	-	-	-	0.14 \pm 0.47
<i>Necora puber</i>	Medium	Coastal	V, M	4	0.01	0.001 \pm 0.012	-	-	-	-	-
<i>Liocarcinus</i> spp.	Medium	Cosmopolite	I-V, M, J	7024	14.75	0.49 \pm 1.01	I-V, M	1604	7.59	2.73 \pm 2.7	0.35 \pm 0.62

(continued)

Table S1 continued

Taxa	Larval cycle	Adults habitat	Algarve			Gibraltar			Alboran					
			Stages	N	F (%)	A \pm SD	Stages	N	F (%)	A \pm SD	Stages	N	F (%)	A \pm SD
<i>Polybius henslowii</i>	Medium	Cosmopolite	-	-	-	-	-	-	-	-	IV	1	0.01	0.001 \pm 0.004
Polybiinae n.id.	-	Coastal	I-III, V, M	14	0.03	0.01 \pm 0.03	-	-	-	-	M	1	0.01	0.04 \pm 0.004
Portunidae n.id.	-	-	-	-	-	-	J	1	0.01	0.02 \pm 0.05	-	-	-	-
<i>Monodaeus couchii</i>	Medium	Oceanic epibenthic	II, M	45	0.09	0.006 \pm 0.015	I, III, M	6	0.03	0.04 \pm 0.13	M	2	0.01	0.002 \pm 0.01
<i>Xantho</i> spp.	Medium	Coastal	I-IV, M	738	1.55	0.22 \pm 0.5	I-IV	228	1.08	1.08 \pm 0.8	I-IV, M	66	0.33	0.05 \pm 0.09
Xanthidae n.id.	-	-	I-IV, M	167	0.35	0.03 \pm 0.16	M	4	0.02	0.04 \pm 0.1	-	-	-	-
<i>Nanocassiope melanodactyla</i>	Medium	Coastal	-	-	-	-	-	-	-	-	I-IV	43	0.22	0.05 \pm 0.26
<i>Eriphia verrucosa</i>	Medium	Intertidal	I, II	44	0.09	0.05 \pm 0.21	-	-	-	-	-	-	-	-
<i>Pilumnus</i> spp.	Medium	Coastal	I-IV, M	673	1.41	0.2 \pm 0.6	I-IV, M	341	1.61	1.47 \pm 1.78	I-IV, M	195	0.99	0.21 \pm 0.52
<i>Goneplax rhomboides</i>	Medium	Coastal	I-V, M	589	1.24	0.16 \pm 0.37	I-IV, M	179	0.84	0.75 \pm 0.78	I-IV, M	892	4.51	0.34 \pm 0.66
Goneplacidae n.id.	-	-	M	9	0.02	0.001 \pm 0.01	-	-	-	-	-	-	-	-
<i>Pinnotheres pisum</i>	Medium	Coastal	II-IV	5	0.01	0.01 \pm 0.07	I-III, M	34	0.17	0.31 \pm 0.74	I-III, M, J	38	0.19	0.06 \pm 0.25
<i>Nepinnotheres pinnotheres</i>	Medium	Coastal	I, II	50	0.11	0.07 \pm 0.28	I, II	10	0.05	0.23 \pm 0.48	I, II	4	0.02	0.02 \pm 0.08
Pinnotheridae n.id.	-	Coastal	-	-	-	-	-	-	-	-	I, II, M	12	0.06	0.05 \pm 0.22
Plagusinae n.id.	-	Coastal	II-IV	7	0.01	0.006 \pm 0.03	-	-	-	-	-	-	-	-
Plagusinae n.id.type ASM29	-	-	I, II	5	0.01	0.003 \pm 0.02	I	1	0.01	0.02 \pm 0.05	-	-	-	-
<i>Pachygrapsus</i> spp.	Long	Intertidal	I-V, M	1284	2.70	0.27 \pm 0.54	I-III	18	0.09	0.21 \pm 0.3	I-IV	9	0.05	0.015 \pm 0.03
<i>Ocypode cursor</i> ?	Medium	Coastal	I-V	179	0.38	0.18 \pm 0.54	I-IV	68	0.34	0.57 \pm 1.54	-	-	-	-
<i>Brachynotus atlanticus</i>	Medium	Intertidal	-	-	-	-	I	1	0.01	0.06 \pm 0.17	-	-	-	-
<i>Brachynotus sexdentatus</i>	Medium	Intertidal	-	-	-	-	-	-	-	-	II-V	59	0.3	0.1 \pm 0.36
<i>Brachynotus</i> sp.	Medium	Intertidal	-	-	-	-	-	-	-	-	I-IV	9	0.05	0.03 \pm 0.11
Brachyura n.id.	-	-	II, M	5	0.01	0.003 \pm 0.02	I, II, M	5	0.02	0.09 \pm 0.19	III, M	11	0.06	0.01 \pm 0.05

Table S2. Principal Component Analysis results presenting the main components that explain sample variability for the measured environmental factors, biomass and biodiversity indices (Shannon diversity - $H'(\log_e)$, taxonomic distinctness - Δ^*) in each studied area: a) Algarve, b) Alboran Sea.

	PC1			PC2			PC3		
	Eigenvalues	% variation	Cum % variation	Eigenvalues	% variation	Cum % variation	Eigenvalues	% variation	Cum % variation
	2.45	51.1	51.1	1.2	24.9	76.0	0.811	16.9	92.9
Variable									
Temperature	-0.452			0.768			-0.437		
Chl-a	0.021			-0.072			0.034		
Biomass	0			0			0		
$H'(\log_e)$	-0.6			0.07			0.778		
Station depth	0.412			0.543			0.404		
Distance to coast	0.516			0.324			0.197		

	PC1		
	Eigenvalues	% variation	Cum % variation
	1.29	81.3	81.3
Variable			
Temperature	0.069		
Chl-a	0.013		
Biomass	0		
$H'(\log_e)$	0.159		
Station depth	-0.866		
Distance to coast	-0.469		

Table S3. SIMPER percentages (Contrib% - similarity contribution percentage) of the most spatially abundant taxa contributing to the similarities between samples for each sampling area and all distance to coast groups considering first stage (ZI) and last stage (megalopae/decapodids) larvae.

ZI		Megalopa/Decapodid	
Taxa	Contrib%	Taxa	Contrib%
Algarve			
Group < 10 km	(Average similarity: 33.93%)	(Average similarity: 26.30%)	
<i>Upogebia deltaura</i>	13.62	<i>Liocarcinus</i> spp.	51.15
<i>Diogenes pugilator</i>	13.32	<i>Diogenes pugilator</i>	22.64
<i>Processa</i> spp.	11.94	-	-
<i>Pachygrapsus</i> spp.	10.28	-	-
Group 10-20 km	(Average similarity: 27.76%)	(Average similarity: 31.66%)	
<i>Pachygrapsus</i> spp.	22.32	<i>Liocarcinus</i> spp.	61.49
<i>Goneplax rhomboides</i>	16.06	<i>Diogenes pugilator</i>	10.86
<i>Xantho</i> spp.	9.52	-	-
<i>Processa</i> spp.	6.05	-	-
Group 21-30 km	(Average similarity: 17.75%)	(Average similarity: 19.94%)	
<i>Goneplax rhomboides</i>	21.76	<i>Liocarcinus</i> spp.	55.75
<i>Xantho</i> spp.	18.36	Majidae n.id.	7.56
<i>Pachygrapsus</i> spp.	17.99	-	-
Group 31-50 km		(Average similarity: 26.73%)	
-	-	<i>Monodaeus couchii</i>	41.92
-	-	Sergestidae n.id.	16.47
Gibraltar			
Group < 10 km	(Average similarity: 29.08%)	(Average similarity: 21.5%)	
<i>Pagurus</i> spp.	12.83	<i>Diogenes pugilator</i>	21.85
<i>Pisidia longicornis</i>	9.14	<i>Liocarcinus</i> spp.	17.18
<i>Pilumnus</i> spp.	8.69	<i>Macropodia</i> spp.	16.81
<i>Diogenes pugilator</i>	7.62	-	-
<i>Upogebia deltaura</i>	7.53	-	-
Group 10-20 km	(Average similarity: 21.36%)	(Average similarity: 9.04%)	
<i>Upogebia deltaura</i>	25.28	<i>Liocarcinus</i> spp.	77.31
<i>Pagurus</i> spp.	17.48	<i>Galathea</i> spp.	22.69
<i>Xantho</i> spp.	14.99	-	-
Group 31-50 km	(Average similarity: 47.57%)	(Average similarity: 6.94%)	
<i>Upogebia deltaura</i>	22.92	Majidae n.id. Tipo "1"	39.93
<i>Diogenes pugilator</i>	15.93	<i>Liocarcinus</i> spp.	21.63
Majidae n.id. Type "1"	10.42	-	-
Alboran			
Group < 10 km	(Average similarity: 24.59%)	(Average similarity: 10.97%)	
<i>Callinassa truncata</i>	24.55	<i>Liocarcinus</i> spp.	50.68
<i>Goneplax rhomboides</i>	24.4	<i>Diogenes pugilator</i>	18.61
Group 10-20 km	(Average similarity: 31.66%)	(Average similarity: 10.21%)	
<i>Gennadas elegans</i>	59.56	<i>Sergestes</i> spp.	55.37
<i>Goneplax rhomboides</i>	11.23	<i>Eusergestes arcticus</i>	20.52

Table S4. SIMPER percentages (Contrib% - similarity contribution percentage) of the most vertically abundant taxa contributing to the similarities between samples for each sampling area and all depth interval groups. Taxa were grouped according to the combination of factors: number of stages in the larval cycle (C3 - long), adult habitats (H1 - intertidal, H3 - endobenthic, H4 - oceanic epibenthic, H5 - Epipelagic, H6 - Mesopelagic, H7 - Cosmopolite) and taxonomic group (T1 - Shrimps, T2 - Caridean shrimps, T4 - Ghost shrimps, T7 - Crabs).

	Taxa	Contrib%	Taxa	Contrib%
	Algarve		Alboran	
Group 0-25 m	(Average similarity: 27.92%)		(Average similarity: 36.66%)	
	C3 x T7 x H1	34.43	C3 x T1 x H6	32.41
	C3 x T2 x H4	18.75	C3 x T2 x H7	17.50
	C3 x T2 x H7	15.71	C2 x T4 x H3	8.41
Group 25-50 m	(Average similarity: 30.13%)		(Average similarity: 21.72%)	
	C3 x T7 x H1	31.13	C3 x T1 x H6	38.30
	C3 x T2 x H4	19.23	C3 x T2 x H7	16.37
	C3 x T2 x H7	11.60	-	-
Group 50-75 m	(Average similarity: 19.64%)		(Average similarity: 41.97%)	
	C3 x T1 x H5	18.36	C3 x T1 x H6	74.31
	C3 x T2 x H4	16.59	C3 x T1 x H4	10.20
	C3 x T7 x H1	15.80	-	-
Group 75-100 m	(Average similarity: 13.77%)		(Average similarity: 31.34%)	
	C3 x T1 x H6	35.41	C3 x T1 x H6	68.33
	C3 x T1 x H4	31.64	C3 x T1 x H4	17.4