

Effects of live and post-mortem shell structures of invasive Pacific oysters and native blue mussels on macrofauna and fish

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Supplement

Table S1. Average abundance of infauna (ind. $0.0075 \text{ m}^{-2} \pm \text{SE}$) in core samples ($\varnothing = 10\text{cm}$) from plots of different treatments (n = 6): Control (C), live Pacific oysters (O), oyster shells (OS), live blue mussels (M) and mussel shells (MS). Average number of taxa/species $0.0075 \text{ m}^{-2} \pm \text{SE}$ is also presented. -: taxon not present

Taxon	C	O	OS	M	MS
ANNELIDA					
Oligochaeta					
Oligochaeta indet	24.8 ± 5.8	23.0 ± 6.9	18.5 ± 7.0	26.8 ± 6.1	13.2 ± 4.0
Polychaeta					
<i>Harmothoe imbricata</i>	1.0 ± 0	1.3 ± 0.2	-	-	2.0 ± 0
<i>Eteone</i> sp.	1.0 ± 0	-	-	1.0 ± 0	-
<i>Phyllodoce mucosa</i>	1.0 ± 0	-	-	-	-
<i>Kefersteinia cirrata</i>	2.0 ± 0.6	3.3 ± 0.6	2.0 ± 0.4	2.7 ± 1.2	1.3 ± 0.2
<i>Nereimyra punctata</i>	-	-	-	-	1.0 ± 0
<i>Hediste diversicolor</i>	10.2 ± 2.4	9.8 ± 2.5	10.0 ± 0.9	6.2 ± 1.1	6.8 ± 0.9
<i>Nephtys caeca</i>	-	1.0 ± 0	-	-	-
<i>Scoloplos armiger</i>	1.0 ± 0	1.0 ± 0	1.5 ± 0.3	5.0 ± 0	4.0 ± 0
<i>Malacoceros tetracerus</i>	-	1.5 ± 0.3	1.7 ± 0.2	2.0 ± 0.8	1.7 ± 0.5
<i>Marenzelleria viridis</i>	6.0 ± 1.2	1.3 ± 0.2	5.3 ± 1.4	1.8 ± 0.4	2.3 ± 0.9
<i>Polydora cornuta</i>	1.0 ± 0	1.0 ± 0	1.5 ± 0.3	-	1.0 ± 0
<i>Pygospio elegans</i>	2.3 ± 0.5	1.5 ± 0.3	2.0 ± 0	-	1.0 ± 0
<i>Capitella</i> sp.	20.3 ± 9.1	7.2 ± 1.7	10.3 ± 5.6	14.8 ± 6.0	6.3 ± 1.9
<i>Heteromastus filiformis</i>	-	-	--	1.0 ± 0	-
<i>Mediomastus fragilis</i>	2.0 ± 0.6	-	-	2.0 ± 0	-
<i>Spirorbidae</i> indet	1.0	-	-	-	-
MOLLUSCA					
Bivalvia					
<i>Cerastoderma edule</i>	-	-	1.7 ± 0.2	-	1.0 ± 0.0
<i>Cerastoderma</i> sp.	1.0	1.0 ± 0	-	-	-
<i>Parvicardium</i> sp.	-	-	-	-	2.0 ± 0
<i>Spisula</i> sp.	-	1.0 ± 0	-	-	-
<i>Macoma balthica</i>	1.7 ± 0.2	1.0 ± 0.0	1.0 ± 0	1.0 ± 0	-
<i>Tapes</i> sp.	-		1.0 ± 0	-	-
<i>Mya arenaria</i>	1.0 ± 0	-	1.0 ± 0	-	1.0 ± 0
<i>Mya truncata</i>	2.0 ± 0	1.0 ± 0	-	-	-
Total abundance	63.5 ± 12.0	42.0 ± 17.1	46.0 ± 10.7	53.3 ± 8.2	31.7 ± 5.0
Species richness	6.83 ± 0.75	6.83 ± 0.60	6.33 ± 0.80	5.67 ± 0.49	6.17 ± 0.70

Table S2. Abundance and biomass of epibenthic fauna (including fish). Biomass was expressed as mg ash free dry weight (AFDW). The biomass of the individuals was calculated by subtracting the burnt weight (ash content) from the initial dry weight of the individuals. For all species with a total number of 6 or more individuals, equations describing the length-AFDW relationship were developed using the pre-registered individual length data from specified references. N_{ind} = number of ind. m⁻², B (mg) = biomass (mg AFDW), B eq. = biomass equation, L= individual length (mm), R² = regression model fit to data, p = regression model significance, N = number of individuals used for development of biomass equation, Ref. = reference for previously published biomass equations

Phylum	Class	Order	Family	Genus	Species	N _{ind.}	B (mg)	B eq.	L (mm)	R ²	p	N	Ref.
Mollusca	Polyplacophora	Lepidopleurida					15972	AFDW=0.61L ^{2.48}	TL				1
			Ischnochitonidae	<i>Lepidochitona</i>	<i>Lepidochitona cinerea</i>	24							
				<i>Tonicella</i> sp.		29							
			Leptochitonidae	<i>Leptochiton</i>	<i>Leptochiton asselus</i>	259							
	Gastropoda	Neotaenioglossa	Littorinidae	<i>Littorina</i>		7503	567126	AFDW=0.04L ^{2.88}	TL				1
					<i>Littorina littorea</i>								
					<i>Littorina saxatilis</i>								
					<i>Littorina obdusata/ fabalis</i>								
		Neogastropoda	Nassariidae	<i>Nassarius</i>	<i>Nassarius nitidus</i>	962	29891	AFDW=0.003e ^{0.16L}	TL _{base to apex}				1
	Bivalvia	Mytiloida	Mytilidae	<i>Mytilus</i>	<i>Mytilus edulis</i>	969	2.5	AFDW=10 ^{2.26Log(L)-4.17}	TL				2
Arthropoda	Malacostraca	Isopoda	Idoteidae	<i>Idotea</i>	<i>Idotea balthica</i>	10	36	AFDW=0.9·10 ^{2.62 Log(L)-1.87}	TL _{head to thorax}				3
			Janiridae	<i>Jaera</i> spp.		33	5.9	AFDW=0.65·10 ^{2.67Log(L)-1.65}	TL _{head to tail}				3
		Amphipoda	Corophiidae				43						
				<i>Corophium</i> spp.		190		AFDW=0.82·10 ^{2.60 Log(L)-1.85}	TL _{head to tail}				3
				<i>Leptocheirus</i> sp.		1							
			Gammaridae/ Talitridae/Aoridae	<i>Gammarus</i> spp./ <i>Microdeutopus</i> sp.	<i>Microdeutopus gryllotalpa</i>	3686	4822	AFDW=0.16 e ^{0.28L}	TL _{front head to telson}				1
		Decapoda	Portunidae	<i>Carcinus</i>	<i>Carcinus maenas</i>	2473	96458	AFDW=e ^{2.57 Ln(L)+Ln0.10}	Back shield with				4
			Galatheidae	<i>Galathea</i> sp.		4	3.8						5
			Paguridae	<i>Pagurus</i>	<i>Pagurus bernhardus</i>	6	1068						5
			Porcellanidae	<i>Pisidia</i>	<i>Pisidia longicornis</i>	1	0.3						5
			Inachidae	<i>Macropodia</i>	<i>Macropodia rostrata</i>	5	29						5
			Crangonidae	<i>Crangon</i>	<i>Crangon crangon</i>	44	4121	AFDW=e ^{2.84 Ln(L)+Ln0.36}	Carapace length _{eye socket to end of shield}				4
			Palaemonidae/ Alpheidae			3288	23930	AFDW=0.21L ^{2.91}	Carapace length _{eye socket to end of shield}	0.97	<0.001	45 [#]	6
				<i>Palaemon</i>	<i>Palaemon adspersus</i>								
					<i>Palaemon elegans</i>								
				<i>Athanas</i>	<i>Athanas nitescens</i>								
	Insecta	Diptera	Chironomidae			2							
Annelida	Polychaeta	Phyllodocida	Nereididae				82						*

Phylum	Class	Order	Family	Genus	Species	N _{ind.}	B (mg)	B eq.	L (mm)	R2	p	N	Ref.
				<i>Nereis</i>	<i>Nereis virens</i>	3							
			Polynoidae				665						
				<i>Harmothoe</i>	<i>Harmothoe imbricata</i>	1							
		Spionida	Spionidae			2	2.0						
Echinodermata	Asteroidea	Forcipulata	Asteriidae				293						
				<i>Asterias</i>	<i>Asterias rubens</i>	60		AFDW=0.15e ^{0.62L}	Body Ø	0.80	<0.001	52	6
				<i>Marthasterias</i>	<i>Marthasterias glacialis</i>	1							See <i>A. rubens</i>
	Echinoidea	Clypeastroidea					3.9						
			Echinocyamidae	<i>Echinocyamus</i>	<i>Echinocyamus pusillus</i>	1							5
		Camarodonta	Parechinidae	<i>Psammechinus</i>	<i>Psammechinus miliaris</i>	1							5
Chordata	Osteichthyes	Perciformes	Labridae	<i>Ctenolabrus</i>	<i>Ctenolabrus rupestris</i>	2	199	AFDW=0.0003L ^{3.42}	TL ^S	0.99	<0.001	6 [□]	6
				<i>Symphodus</i>	<i>Symphodus melops</i>	4	845		TL ^S				See <i>C. rupestris</i>
			Gobiidae	<i>Gobiusculus</i>	<i>Gobiusculus flavescens</i>	21	1217	AFDW=e ^{3.61 Ln(L)+Ln0.0002}	TL ^S				4
				<i>Gobius</i>	<i>Gobius niger</i>	42	8659	AFDW=9E-05L ^{3.73}	TL ^S	0.98	<0.001	42	6
				<i>Pomatoschistus</i>		88	2114	AFDW=e ^{3.61Ln(L)+Ln0.0002}	TL ^S				4
					<i>Pomatoschistus microps</i>	4							
					<i>Pomatoschistus minutus</i>	29							
					<i>Pomatoschistus pictus</i>	24							
			Pholididae	<i>Pholis</i>	<i>Pholis gunnellus</i>	23	2334	AFDW=2.54e ^{0.06L}	TL ^S	0.88	<0.001	23	6
		Scorpaeniformes	Cottidae	<i>Myoxocephalus</i>	<i>Myoxocephalus scorpius</i>	65	9764	AFDW=0.0006L ^{3.25}	TL ^S	0.89	<0.001	65	6
		Pleuronectiformes	Pleuronectidae	<i>Pleuronectes</i>	<i>Pleuronectes platessa</i>	4	923	AFDW=e ^{3.25Ln(L)+Ln0.0007}	TL ^S				4
				<i>Limanda</i>	<i>Limanda limanda</i>	1	235		TL ^S				See <i>P. platessa</i>
		Syngnathiformes	Syngnathidae	<i>Syngnathus</i>	<i>Syngnathus typhle</i>	4	496	AFDW=0.0002L ^{2.72}	TL ^S				1

1 Nohrén et al. (2009)

2 Rodhouse et al. (1984)

3 Rumohr et al. (1987)

4 Pihl & Rosenberg (1982)

5 Only biomass (<6 replicates)

6 Developed equation

* No equations because of fragmentation

294 pooled individuals

□ *C. rupestris* + *S. melops*

§ Total body length