Table S1: Summary of the parameters characterizing the oyster larvae analyzed in this study

Variables	Description	Unit of measure	Abbreviation
Oyster variables			
Pediveligers	*Abundance of pre-settled pediveliger larvae on collector plates*	*ind. plate^{-1}*	*pediveligers*
Metamorphosed postlarvae	*Abundance of newly metamorphosed postlarvae on collector plates*	*ind. plate^{-1}*	*postlarvae*
Young settlers	*Abundance of pediveligers+ postlarvae on collector plates*	*ind. plate^{-1}*	*young settlers*
Juveniles	*Abundance of recruited juveniles on collector plates*	*ind. plate^{-1}*	*juveniles*
Prodissoconch II size	*Measurement of prodissoconch maximum shell height along maximal dorsoventral axis of larvae or juvenile Pacific oysters*	*µm*	*PII size*
Total fatty acids in young settlers	*Total fatty acid contents in larvae (young settlers)*	*ng lavae^{-1}*	*TFA*
Essential fatty acids	*Sum of essential fatty acids in larvae (docosahexaenoic acid (22:6ω3; DHA), eicosapentaenoic acid (20:5ω3; EPA) and arachidonic acid (AA))*	*ng lavae^{-1}*	*EFA*

Table S2: Summary of the parameters characterizing the environment analyzed in this study.

Variables	***Description***	***Unity***	***Abbreviation***
Environmental variables			
Temperature	*Discrete measure*	*°C*	*-*
Salinity	*Discrete measure*	*No unit*	*-*
Oxygen concentration	*Discrete measure*	*mg l^{-1}*	*-*
Total particulate matter$_{0.7\text{-}20\ \mu m}$	*Total particular pelagic material in the 0.7-20 µm fraction*	*mg l^{-1}*	*$TPM_{0.7\text{-}20\mu m}$*
Particulate organic matter$_{0.7\text{-}20\mu m}$	*Particulate pelagic material in fraction the 0.7-20 µm fraction*	*mg l^{-1}*	*$POM_{0.7\text{-}20\mu m}$*
Particulate inorganic matter$_{0.7\text{-}20\mu m}$	*Particulate inorganic pelagic material in the fraction 0.7-20 µm fraction*	*mg l^{-1}*	*$PIM_{0.7\text{-}20\mu m}$*
TFA content in $TPM_{0.7\text{-}20}$	*TFA content in $TPM_{0.7\text{-}20}$*	*µg mg $TPM_{0.7\text{-}20}^{-1}$*	
Total chlorophyll a	*Total chlorophyll a biomass*	*µgChla l^{-1}*	*Chloa*
Total chlorophyll b	*Total chlorophyll b biomass*	*µgChlb l^{-1}*	*Chlob*
Total chlorophyll c	*Total chlorophyll c biomass*	*µgChlc l^{-1}*	*Chloc*
Picophytoplankton biomass	*Chlorophyll a biomass in the <3 µm fraction (picoeukaryotes)*	*µgChla l^{-1}*	*pico_Chloa*
Nanophytoplankton biomass	*Chlorophyll a biomass in the 3-20 µm fraction (nanoeukaryotes)*	*µgChla l^{-1}*	*nano_Chloa*
Picophytoplankton+ nanophytoplankton	*Biomass*	*µgChla l^{-1}*	*nano_total_Chloa*
Microphytoplankton > 20 µm	*Biomass (microeukaryotes)*	*µgChla l^{-1}*	*micro_Chloa*
Bacteria	*Abundance of picocyanobacteria (<1 µm)*	*10^6 cell. l^{-1}*	*bacteria*
Total picoeukaryotes	*Abundance*	*10^6 cell. l^{-1}*	*peuk_tot*
picoeukaryotes+ cyanophyceae	*Abundance*	*10^6 cell. l^{-1}*	*pico_tot*
Nanophytoplankton	*Abundance*	*10^6 cell. l^{-1}*	*nano*
cryptophyceae	*Abundance*	*10^6 cell. l^{-1}*	*crypto*

Nanophytoplankton + cryptophyceae	*Abundance*	*10^6 cell. l^{-1}*	*nano_tot*
Heterotrophic flagellates	*Abundance*	*cell l^{-1}*	*HF*
Ciliates	*Abundance*	*cell l^{-1}*	*ciliates*
Tintinnidae	*Abundance*	*cell l^{-1}*	*tinti*
Diatoms	*Abundance*	*cell l^{-1}*	*diatom*
Dinoflagellates	*Abundance*	*cell l^{-1}*	*dinoflagellate*
Territorial competition by worms			
Worm coverage	*Percent cover of tubeworms (Ficopomatus enigmaticus) on plates*	*%*	-

Table S3: multivariate PERMANOVA investigating site and year effect for Temperature

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
site	3	7,087	2,3623	1,158	0,3305	9951	0,3335
year	1	135,72	135,72	66,53	0,0001	9825	0,0001
position	1	3,2	3,2	1,5686	0,2085	9805	0,217
sitexyear	3	0,3865	0,12883	0,063154	0,9764	9951	0,9754
sitexposition	3	2,573	0,85767	0,42042	0,7357	9950	0,7371
yearxposition	1	1,1045	1,1045	0,54142	0,4681	9828	0,473
sitexyearxposition	3	0,0865	0,028833	0,014134	0,9977	9955	0,9977
Res	64	130,56	2,04				
Total	79	280,72					

Table S4: multivariate PERMANOVA investigating site, depth and year effect for salinity

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Site	3	5,331	1,777	7,5677	0,0002	9962	0,0004
Year	1	2,2445	2,2445	9,5587	0,0031	9805	0,0034
position	1	0,072	0,072	0,30663	0,5764	9733	0,5827
sitexyear	3	0,5245	0,17483	0,74457	0,5286	9960	0,5323
sitexposition	3	0,059	0,019667	0,083755	0,9666	9945	0,9679
yearxposition	1	0,1125	0,1125	0,47911	0,4824	9806	0,4966
sitexyearxposition	3	0,0805	0,026833	0,11428	0,9545	9942	0,9503
Res	64	15,028	0,23481				
Total	79	23,452					

Table S5: multivariate PERMANOVA investigating site, depth and year effect for oxygen

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
site	3	3,8333	1,2778	1,3099	0,2739	9944	0,27
year	1	15,878	15,878	16,277	0,0004	9825	0,0001
position	1	10,039	10,039	10,292	0,002	9854	0,0018
sitexyear	3	10,01	3,3366	3,4205	0,0215	9947	0,0217
sitexposition	3	3,8499	1,2833	1,3156	0,2758	9955	0,2805
yearxposition	1	3,3048	3,3048	3,388	0,0708	9812	0,0682
sitexyearxposition	3	1,7959	0,59865	0,6137	0,6012	9955	0,5985
Res	64	62,43	0,97547				
Total	79	111,14					

Table S6: multivariate PERMANOVA investigating site and year effect for TPM

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
site	3	1,493	0,49767	0,28089	0,8424	9962	0,8364
year	1	207,48	207,48	117,1	0,0001	9839	0,0001
sitexyear	3	2,0244	0,67479	0,38085	0,7691	9958	0,7708
Res	100	177,18	1,7718				
Total	107	388,6					

Table S7: multivariate PERMANOVA investigating site and year effect for PIM

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
site	3	0,11747	0,039156	0,039431	0,9901	9949	0,9904
year	1	54,939	54,939	55,325	0,0001	9814	0,0001
sitexyear	3	0,33001	0,11	0,11077	0,957	9958	0,9508
Res	100	99,303	0,99303				
Total	107	154,73					

Table S8: multivariate PERMANOVA investigating site and year effect for POM

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
site	3	1,4638	0,48793	2,796	0,0429	9952	0,0407
year	1	48,888	48,888	280,15	0,0001	9824	0,0001
sitexyear	3	1,193	0,39765	2,2787	0,0834	9952	0,0832
Res	100	17,451	0,17451				
Total	107	69,327					

Table S9: multivariate PERMANOVA investigating site, size and year effect for CHLOA

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
site	3	3,35	1,1167	3,9887	0,0088	9958	0,0088
year	1	3,6519	3,6519	13,045	0,0003	9848	0,0007
taille	2	1,8257	0,91286	3,2608	0,0401	9953	0,0456
sitexyear	3	2,9083	0,96945	3,4629	0,0167	9953	0,0175
sitexsize	6	1,984	0,33066	1,1811	0,3199	9933	0,3246
yearxsize	2	5,0665	2,5333	9,0488	0,0004	9951	0,0004
sitexyearxsize	6	0,84964	0,14161	0,50582	0,8156	9949	0,8092
Res	96	26,876	0,27995				
Total	119	46,512					

Table S10: multivariate PERMANOVA investigating site and year effect for PEUK_TOT

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
site	3	1,2885E+16	4,2951E+15	1,3441	0,2784	9945	0,2768
year	1	1,959E+16	1,959E+16	6,1306	0,0155	9835	0,0187
sitexyear	3	2,6684E+15	8,8948E+14	0,27835	0,8512	9952	0,8401
Res	32	1,0226E+17	3,1955E+15				
Total	39	1,374E+17					

Table S11: multivariate PERMANOVA investigating site, size and year effect for CYAN

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
site	3	2,552E+16	8,5068E+15	0,7044	0,5664	9949	0,5635
year	1	5,3384E+17	5,3384E+17	44,205	0,0001	9851	0,0001
sitexyear	3	1,2146E+16	4,0486E+15	0,33524	0,8082	9953	0,797
Res	32	3,8645E+17	1,2077E+16				
Total	39	9,5796E+17					

Table S12: multivariate PERMANOVA investigating site, size and year effect for PICO

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
site	3	2,3685E+15	7,8951E+14	0,083154	0,9729	9939	0,9697
year	1	7,5797E+17	7,5797E+17	79,832	0,0001	9841	0,0001
sitexyear	3	3,7254E+15	1,2418E+15	0,13079	0,9431	9944	0,938
Res	32	3,0383E+17	9,4946E+15				
Total	39	1,0679E+18					

Table S13 : multivariate PERMANOVA investigating site, size and year effect for BACT_TOT

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
site	3	1,622E+19	5,4066E+18	0,93657	0,4508	9949	0,4387
year	1	2,909E+20	2,909E+20	50,392	0,0001	9839	0,0001
sitexyear	3	1,0607E+19	3,5358E+18	0,61249	0,6213	9957	0,6151
Res	32	1,8473E+20	5,7728E+18				
Total	39	5,0246E+20					

Table S14 : multivariate PERMANOVA investigating site, size and year effect for NANO

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
site	3	1,2396E+12	4,1319E+11	0,13497	0,9421	9944	0,9377
year	1	1,7765E+13	1,7765E+13	5,8032	0,0196	9837	0,0175
sitexyear	3	2,0028E+13	6,6759E+12	2,1807	0,1051	9950	0,1082
Res	32	9,7961E+13	3,0613E+12				
Total	39	1,3699E+14					

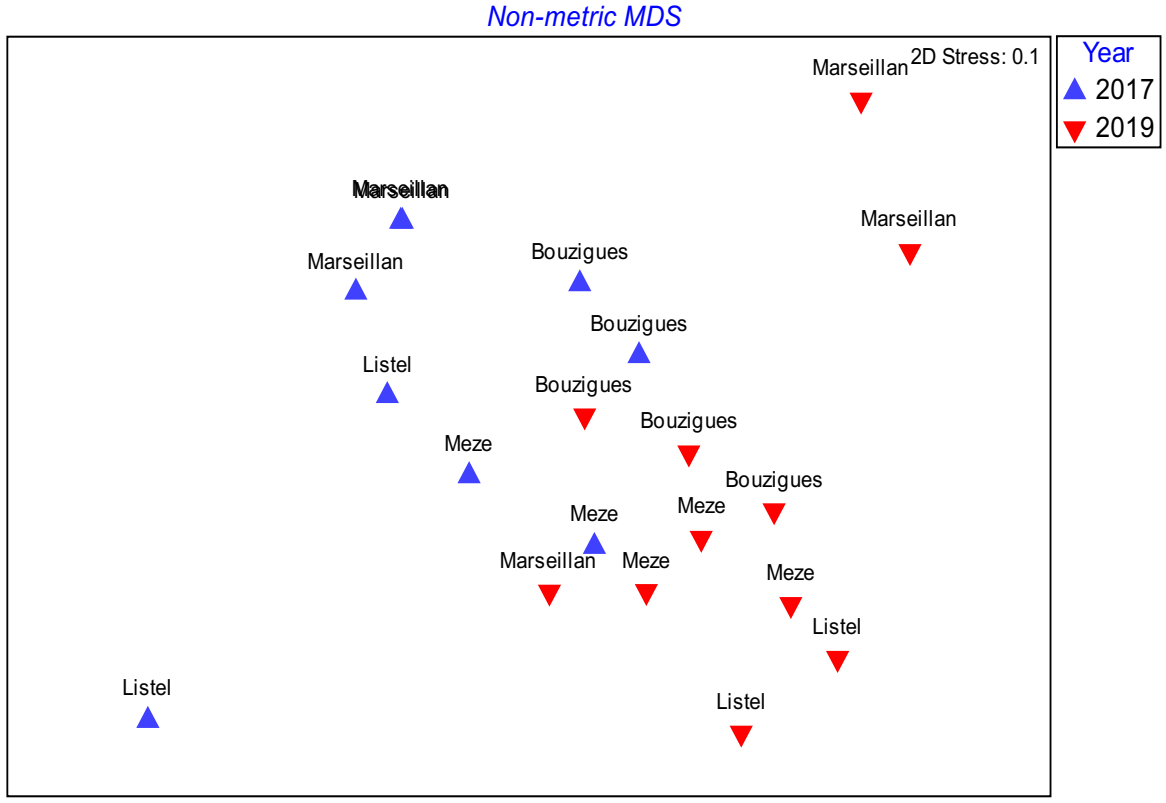

Figure S1. Non-metric multidimensional scaling of the Euclidean similarity matrix based on the relative abundance of fatty acid profiles measured in young settler larvae collected in 2017 and 2019 at each sampling site in the Thau lagoon