

Fig. S1. Wind conditions of the Mobile Bay-eastern Mississippi Sound system leading up to the beginning of an exponential increase in spat settlement for 2014 (a) and 2016 (b). The left panels show wind conditions 2-weeks prior to the potential spawning event and 4-weeks prior to the increase in settlement. The middle panels show wind conditions during the potential spawning event. The right panels show the wind conditions during the increase in settlement.

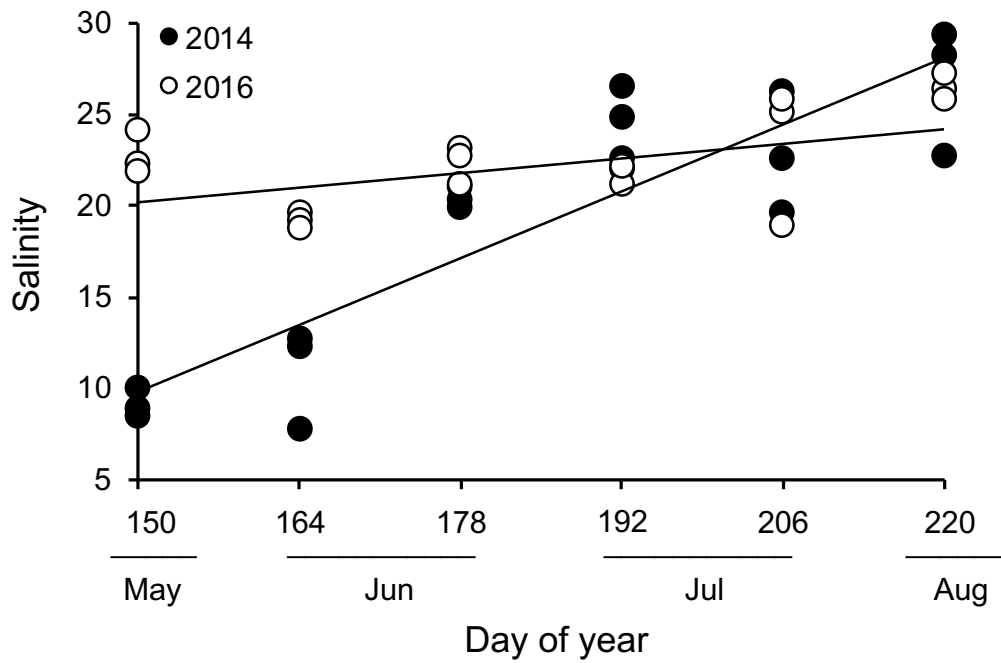


Fig. S2. Salinity differences between 2014 and 2016 (*cf* slope and intercept statistics in Table S4). To determine differences between years, sites (EMS1, EMS2, MB1) and time periods that were measured in both years and at the same time had appreciable settlement were used. The selected sites were not statically different and were used as replicates.

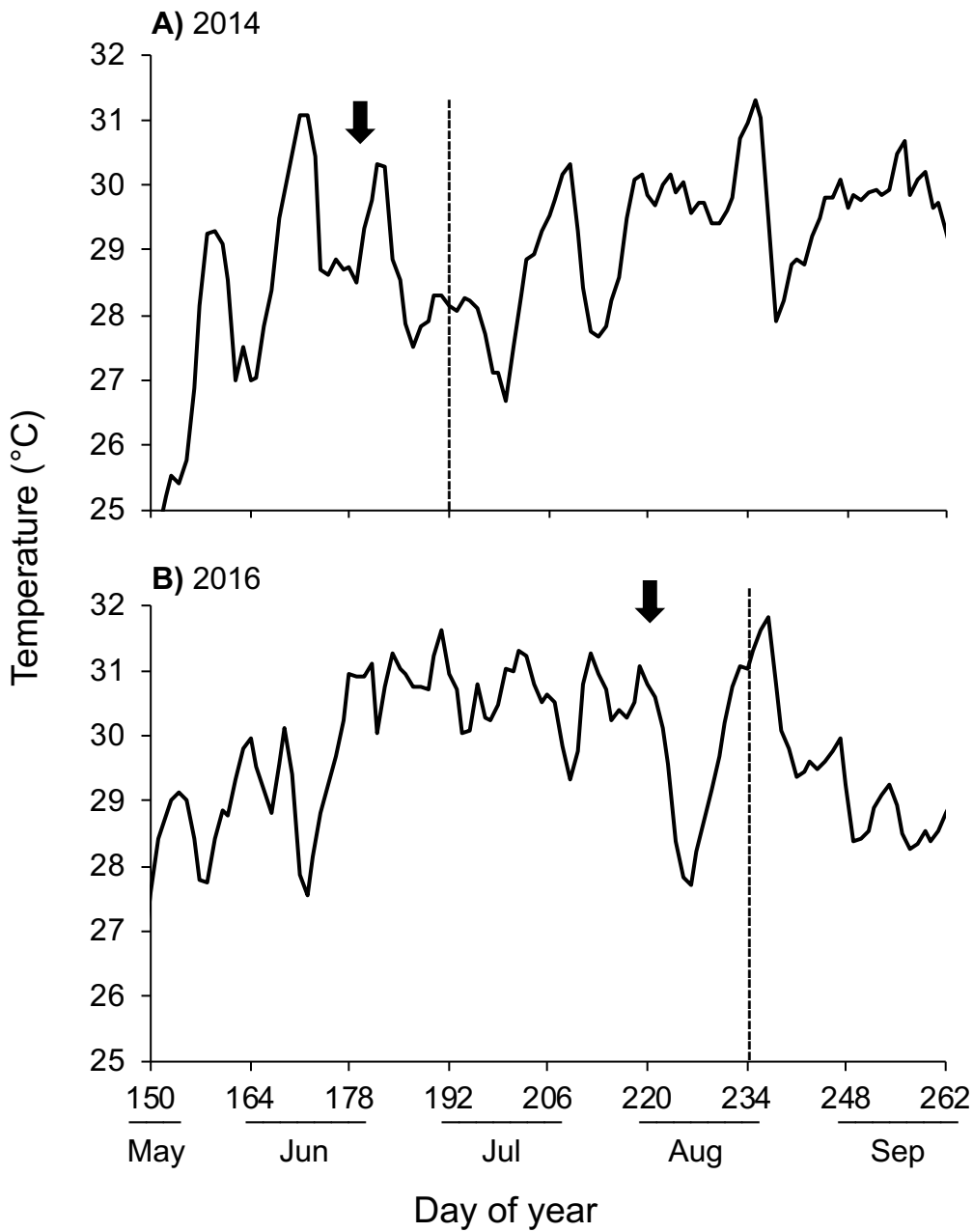


Fig. S3. Water temperature (Dauphin Island NOAA tides and currents station) throughout the settlement sampling period in 2014 (a) and 2016 (b). Dashed lines indicate the beginning of an exponential increase in spat settlement. Arrows indicate possible brood stock spawning events.

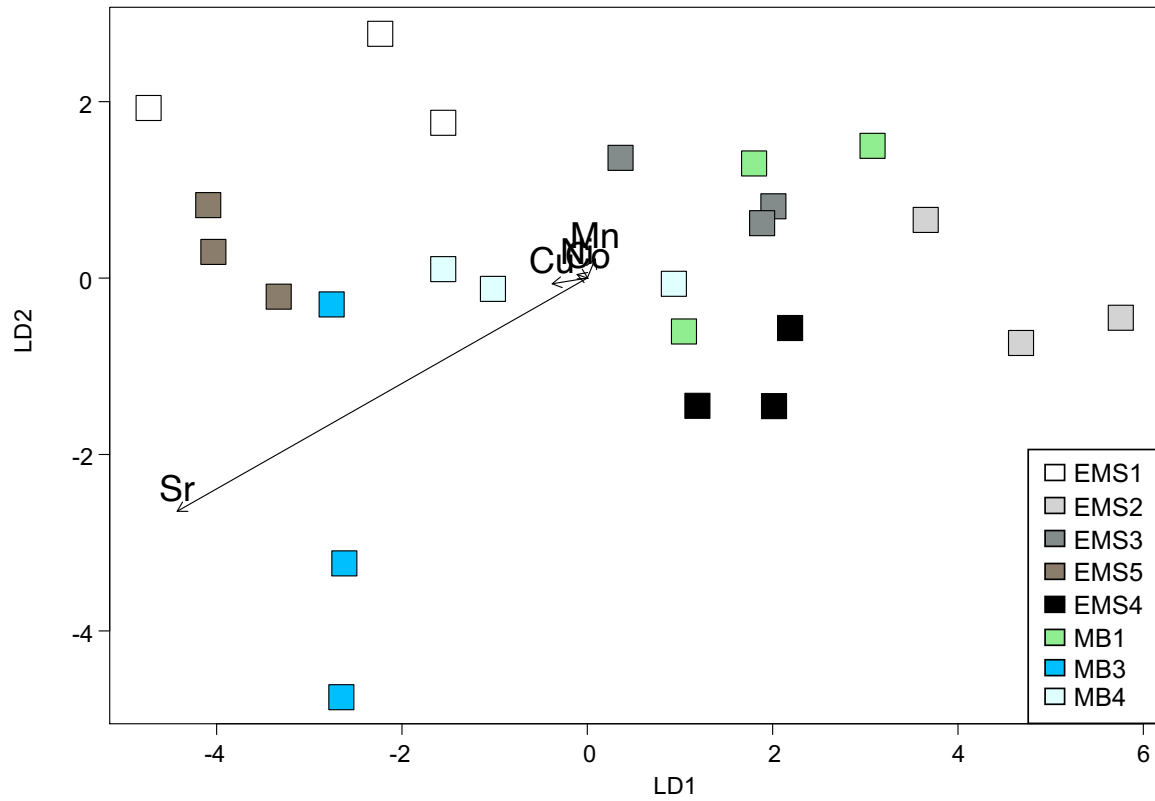


Fig. S4. Biplots showing the first two linear discriminants from the larval origin prediction linear discriminant function analysis using trace element (TE) ratios in recent adult shell. Arrows indicate TE ratios causing site differences.

Table S1. Sites for settlement plate and native adult oyster collection.

Site	Latitude (°N)	Longitude (°W)
EMS1	30.343	-88.349
EMS2	30.305	-88.273
EMS3	30.348	-88.232
EMS4	30.339	-88.254
EMS5	30.383	-88.282
MB1	30.299	-88.124
MB2	30.349	-88.121
MB3	30.319	-87.788
MB4	30.336	-88.101
MB5	30.332	-87.962
MB6	30.412	-88.071
MB7	30.547	-88.071
MB8	30.651	-88.033

Table S2. Intercept statistics for negative binomial general linear model (2014) and zero-altered negative binomial model (2016) in Fig. 3. Slopes for 2014 and 2016 sites are 0.38 and 0.34, respectively, and 95% confidence intervals, *z* statistics, and *p*-values are in relation to site EMS2. Bold *p*-values are statistically significant.

Year	Site	Intercept	95% CI	<i>z</i> value	<i>p</i> -value
2014	EMS1	0.50	2.34	0.82	0.41
	EMS2	0.32	3.62	-1.44	0.15
	MB1	0.06	2.45	-2.71	0.01
2016	EMS1	0.35	2.10	1.14	0.25
	EMS2	0.19	2.34	-2.79	0.01
	EMS3	0.68	2.17	2.32	0.02
	MB1	0.29	1.99	0.86	0.39
	MB4	0.17	2.19	-0.21	0.83
	MB6	0.08	2.77	-1.20	0.23

Table S3. Intercept statistics for regression lines for 2016 in Fig. 5a, with 95% confidence intervals, *t* statistics, and *p*-values in relation to site EMS2. Bold *p*-values are statistically significant. Interaction: $F_{5,42} = 1.37$, $p = 0.26$, Site_{main effect}: $F_{5,47} = 18.16$, $p < 0.0001$, Week_{main effect}: $F_{5,47} = 40.01$, $p < 0.0001$, all sites: slope = 0.34

Site	Intercept	95% CI	<i>t</i> statistic	<i>p</i> -value
EMS1	20.39	3.82	0.77	0.44
EMS2	19.66	3.72	21.24	<0.0001
EMS3	16.20	3.82	-3.64	<0.001
MB1	17.68	3.82	-2.08	0.04
MB4	16.16	3.82	-3.69	<0.001
MB6	12.31	3.82	-7.73	<0.0001

Table S4. Slope and intercept statistics for regression lines for salinity in Fig. S2 in 2014 and 2016. Bold *p*-values are statistically significant

Year	Slope	Intercept	95% CI	<i>t</i> statistic	<i>p</i> -value
2014	1.83	2.50	0.80	9.26	<0.0001
2016	0.40	18.60	1.14	-5.02	<0.0001

Table S5. Two-way MANOVA results of spat shells during three time periods to determine if multi-elemental trace element ratios between larval and settled shell of spat were different among sites and between shell types. Bold *p*-values are statistically significant

MANOVA	Hypothesis df	Error df	Pillai's Trace	<i>F</i>	<i>p</i>
<u>May-Jun</u>					
Site	48	48	2.96	2.86	<0.001
Shell	12	9	0.93	10.77	<0.001
Site x shell	48	48	2.46	1.59	0.06
Error					
<u>Jul-Aug</u>					
Site	48	48	2.93	2.74	<0.001
Shell	12	9	0.90	6.92	<0.001
Site x shell	48	48	2.17	1.19	0.28
Error					
<u>Aug-Sep</u>					
Site	60	85	2.87	1.92	<0.001
Shell	12	13	0.80	4.34	<0.001
Site x shell	60	85	2.46	1.38	0.09
Error					

Table S6. ANOVA (univariate) results following 2-way MANOVAs (Table S5) of spat shells during three time periods to determine which individual trace element ratios differed among sites and between the larval and settled shell of spat. Bold *p*-values are statistically significant

	May-June				July-August				August-September			
	df	MS	F	<i>p</i>	df	MS	F	<i>p</i>	df	MS	F	<i>p</i>
Mg												
Site	4	1.37	3.08	0.04	4	14.20	3.41	0.03	5	1.39	1.27	0.31
Shell	1	25.00	56.30	<0.0001	1	32.30	7.75	0.01	1	25.30	23.00	<0.0001
Site x shell	4	0.52	1.18	0.35	4	9.75	2.34	0.09	5	2.08	1.90	0.13
Error		200.44				204.16				241.10		
V												
Site	4	1.56	2.49	0.08	4	8.20	7.28	<0.001	5	2.13	0.75	0.59
Shell	1	7.10	11.40	<0.01	1	1.50	1.33	0.26	1	24.60	8.70	0.01
Site x shell	4	0.50	0.79	0.54	4	3.60	3.20	0.03	5	2.26	0.80	0.56
Error		200.62				201.13				242.82		
Cr												
Site	4	4.28	2.37	0.09	4	9.05	6.90	<0.01	5	1.69	0.63	0.68
Shell	1	16.40	9.08	0.01	1	1.34	1.02	0.32	1	24.20	9.06	0.01
Site x shell	4	1.48	0.82	0.53	4	4.23	3.22	0.03	5	2.04	0.76	0.59
Error		201.81				201.31				242.68		
Mn												
Site	4	2.46	4.40	0.01	4	3.00	7.60	<0.0001	5	2.12	1.79	0.15
Shell	1	6.25	11.20	<0.01	1	0.03	0.07	0.79	1	5.23	4.41	0.05
Site x shell	4	0.35	0.63	0.65	4	1.54	3.89	0.02	5	0.96	0.81	0.56
Error		200.56				200.40				241.19		
Fe												
Site	4	4.76	2.50	0.08	4	13.70	7.20	<0.001	5	1.40	0.89	0.50
Shell	1	22.90	12.00	<0.01	1	3.34	1.76	0.20	1	15.90	10.10	<0.01
Site x shell	4	1.24	0.65	0.63	4	5.69	2.99	0.04	5	1.29	0.82	0.55
Error		201.91				201.90				241.58		
Co												
Site	4	2.65	6.64	<0.01	4	10.50	7.18	<0.001	5	3.98	1.35	0.28
Shell	1	4.23	10.60	<0.01	1	1.64	1.12	0.30	1	27.00	9.15	0.01
Site x shell	4	0.16	0.40	0.81	4	5.30	3.61	0.02	5	2.79	0.95	0.47
Error		200.40				201.47				242.95		
Ni												
Site	4	1.87	1.11	0.38	4	7.77	5.90	<0.01	5	2.90	1.03	0.42
Shell	1	8.51	5.04	0.04	1	1.20	0.91	0.35	1	23.40	8.28	0.01
Site x shell	4	0.36	0.22	0.93	4	5.06	3.85	0.02	5	1.71	0.61	0.70
Error		201.69				201.32				242.82		
Cu												
Site	4	25.80	2.35	0.09	4	3.29	7.97	<0.001	5	5.31	1.60	0.20
Shell	1	0.32	0.03	0.87	1	0.19	0.47	0.50	1	6.66	2.00	0.17
Site x shell	4	11.30	1.03	0.42	4	2.78	6.72	<0.01	5	2.25	0.68	0.64
Error		2011.00				200.41				243.32		
Zn												
Site	4	4.11	1.51	0.24	4	10.10	7.60	<0.001	5	3.14	1.73	0.17
Shell	1	27.00	9.93	0.01	1	1.50	1.13	0.30	1	25.00	13.80	<0.01
Site x shell	4	1.16	0.43	0.79	4	4.47	3.37	0.03	5	2.24	1.23	0.32
Error		202.71				201.33				241.81		
Sr												

Site	4	0.50	5.43	<0.01	4	0.29	10.20	<0.001	5	0.08	3.64	0.01
Shell	1	3.23	35.38	<0.0001	1	0.29	10.10	<0.01	1	0.05	2.59	0.12
Site x shell	4	0.10	1.10	0.39	4	0.09	3.13	0.04	5	0.05	2.15	0.09
Error		200.09				200.03				240.02		
Ba												
Site	4	3.55	1.95	0.14	4	9.28	5.52	<0.01	5	2.93	1.14	0.36
Shell	1	20.00	10.95	<0.01	1	4.06	2.41	0.14	1	33.60	13.10	<0.01
Site x shell	4	1.93	1.06	0.40	4	3.54	2.10	0.12	5	2.83	1.10	0.39
Error		201.83				201.68				242.57		
Pb												
Site	4	2.85	2.76	0.06	4	10.08	6.68	<0.01	5	3.21	0.67	0.65
Shell	1	6.98	6.78	0.02	1	0.95	0.63	0.44	1	38.30	7.99	0.01
Site x shell	4	1.00	0.97	0.45	4	4.20	2.78	0.05	5	4.14	0.86	0.52
Error		201.03				201.51				244.79		

Table S7. MANOVA (multivariate) and ANOVA (univariate) results for larval and settled shell during three time periods used to determine if there were differences in multi-elemental (MANOVA) and individual (ANOVA) trace element ratios among sites. Bold *p*-values are statistically significant

Shell type	Time period	MANOVA	Pillai's Trace	Hypothesis df	Error df	<i>F</i>	<i>p</i>
Larval	May–Jun	All TEs	2.95	24	32	3.75	<0.001
		ANOVA		df	MS	<i>F</i>	<i>p</i>
		Sr		4	0.02	5.28	0.02
		Cu		4	56.91	4.77	0.02
		Co		4	9.62	4.77	0.02
		V		4	10.30	2.08	0.16
		Mn		4	1.57	3.60	0.05
	Ni		4	0.16	2.96	0.07	
	Jul–Aug	MANOVA	Pillai's Trace	Hypothesis df	Error df	<i>F</i>	<i>p</i>
		All TEs	3.13	40	16	1.43	0.22
	Aug–Sep	MANOVA	Pillai's Trace	Hypothesis df	Error df	<i>F</i>	<i>p</i>
		All TEs	1.09	10	24	2.88	0.02
		ANOVA		df	MS	<i>F</i>	<i>p</i>
		Mn		5	1.17	3.65	0.03
Sr			5	0.02	2.68	0.07	
Settled	May–Jun	MANOVA	Pillai's Trace	Hypothesis df	Error df	<i>F</i>	<i>p</i>
		All TEs	3.37	40	16	2.14	0.05
	Jul–Aug	MANOVA	Pillai's Trace	Hypothesis df	Error df	<i>F</i>	<i>p</i>
		All TEs	2.23	12	30	7.19	<0.0001
		ANOVA		df	MS	<i>F</i>	<i>p</i>
		Mn		4	4.75	10.42	<0.001
		Sr		4	0.31	6.69	0.01
	Aug–Sep	Cu		4	4.26	12.69	<0.0001
		MANOVA	Pillai's Trace	Hypothesis df	Error df	<i>F</i>	<i>p</i>
		All TEs	3.01	30	55	2.76	<0.0001
		ANOVA		df	MS	<i>F</i>	<i>p</i>
		Sr		5	0.11	2.93	0.06
		V		5	0.86	0.29	0.91
		Co		5	0.74	0.26	0.93
Cr		5	0.97	0.32	0.89		
Zn		5	1.39	0.68	0.65		
Ni		5	1.08	0.45	0.81		

Table S8. Standardized coefficients explaining the relative contribution of elements to discriminant among sites for larval and settled shell linear discriminant function (LDA) analyses for time periods that had significant MANOVAs. Percent variance explained indicates how much variation each linear discriminant explains for site separation. Larval (July–August) and settled (May–June) shells did not have significant MANOVAs to proceed with LDAs and thus results are not shown

Shell type	Time period	Me:Ca	LD1	LD2	LD3	LD4	LD5
Larval	May–Jun	Sr	-17.71	-11.98	11.32	-1.21	-
		Cu	-0.59	-0.42	-0.02	0.04	-
		Co	0.35	-2.60	-0.34	0.11	-
		V	2.29	0.60	0.47	-0.40	-
		Mn	-4.31	1.80	-1.65	-0.96	-
		Ni	-6.89	8.97	0.82	3.49	-
		% variance explained	69.6	22.6	5.7	2.1	-
	Aug–Sep	Mn	1.80	1.16	-	-	-
		Sr	-0.46	-15.38	-	-	-
		% variance explained	61.5	38.5	-	-	-
Settled	Jul–Aug	Cu	3.15	-2.02	3.14	-	-
		Sr	-5.11	-3.43	-4.77	-	-
		Mn	-0.34	2.19	-2.49	-	-
		% variance explained	60.0	28.9	11.1	-	-
	Aug–Sep	Sr	-32.73	5.87	-9.52	7.43	4.15
		V	10.63	1.83	-2.78	-8.16	-0.86
		Co	-5.40	7.17	-4.91	6.57	2.06
		Cr	-1.50	-6.90	5.10	5.06	1.85
		Zn	5.10	-1.27	6.47	-2.86	0.19
		Ni	-5.54	-1.52	-2.24	-1.93	-4.02
	% variance explained	75.4	13.1	6.3	4.7	0.6	

Table S9. MANOVA (multivariate) and ANOVA (univariate) results for recent (single year) and whole (multiple years) shell used to determine if there were differences in multi-elemental (MANOVA) and individual (ANOVA) trace element ratios among sites. Bold *p*-values are statistically significant

Shell type	Pillai's Hypothesis		df	Error df	<i>F</i>	<i>p</i>
	MANOVA	Trace				
Recent	All elements	4.34	72	136	2.24	<0.0001
	ANOVA		df	MS	<i>F</i>	<i>p</i>
	Cr		8	1.32×10 ⁶	4.62	0.003
	Mn		8	3.26	1.63	0.19
	Fe		8	1.77	6.35	<0.001
	Co		8	6.79×10 ⁶	4.36	0.005
	Ni		8	427.25	1.22	0.34
	Cu		8	4.67	5.11	0.002
	Zn		8	31.92	0.62	0.75
	Sr		8	0.20	3.19	0.02
Pb		8	4.48×10 ³	0.57	0.79	
Whole	Pillai's Hypothesis		df	Error df	<i>F</i>	<i>p</i>
	MANOVA	Trace				
	All elements	4.14	64	144	2.42	<0.0001
	ANOVA		df	MS	<i>F</i>	<i>p</i>
	Mg		8	0.00	0.80	0.61
	Cr		8	3.10×10 ⁵	8.08	<0.0001
	Fe		8	1.66	5.11	0.002
	Co		8	4.03×10 ⁶	1.94	0.12
	Ni		8	280.02	3.53	0.01
	Cu		8	9.89	9.55	<0.0001
Sr		8	0.11	1.16	0.37	
Ba		8	4.44×10 ⁴	1.43	0.25	

Table S10. Standardized coefficients explaining the relative contribution of elements to discriminant among sites for recent (single year) and whole (multiple years) shell linear discriminant function analyses. Percent variance explained indicates how much variation each linear discriminant explains for site separation

Shell type	Me:Ca	LD1	LD2	LD3	LD4	LD5	LD6	LD7	LD8
Recent	Cr	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00
	Mn	1.93	0.07	0.02	-0.43	-0.39	-0.37	-0.15	0.22
	Fe	-8.27	1.60	-0.31	-2.17	0.05	-0.10	-0.94	0.22
	Co	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Ni	0.15	-0.06	-0.06	-0.03	0.07	-0.02	-0.03	0.03
	Cu	-0.94	-1.31	0.12	-0.58	-0.07	0.81	0.12	-0.08
	Zn	-0.37	-0.25	0.14	0.15	-0.17	0.14	-0.10	-0.04
	Sr	-7.78	-4.33	-0.64	2.06	0.31	-0.34	2.06	1.33
	Pb	-0.02	0.02	0.01	-0.00	0.01	-0.02	0.01	-0.01
		% variance explained	69.1	21.0	6.6	1.9	0.9	0.3	0.1
Whole	Mg	-5.80	-8.81	-5.84	16.22	10.83	-6.70	-12.80	12.80
	Cr	-0.00	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00
	Fe	-4.81	-3.79	-0.75	0.85	-0.67	1.34	-0.44	-0.35
	Co	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00
	Ni	0.09	0.01	0.07	0.03	0.04	0.09	-0.06	0.02
	Cu	0.52	-0.77	-0.65	-0.05	0.27	0.03	0.47	0.06
	Sr	-9.35	-1.41	4.07	-3.11	1.56	-0.90	1.88	2.44
	Ba	0.02	0.00	-0.01	0.00	-0.01	0.00	-0.00	-0.00
		% variance explained	78.6	13.8	3.2	1.8	1.5	0.7	0.3

Table S11. Validation results of larval and settled shell linear discriminant function (LDA) analyses for time periods that had significant MANOVAs. Classification matrix indicates the predicted site from the model dataset. Jack-knifed classification matrix indicates the leave-one-out cross-validation used to test the robustness of the larval and settled shell classification. Bold indicates % of total sites correctly classified. Larval (July–August) and settled (May–June) shells did not have significant MANOVAs to proceed with LDAs and thus results are not shown

Shell type	Time period	True site	Predicted site						% correct	
			EMS1	EMS2	EMS3	MB1	MB4	MB5		MB6
Larval	May-Jun	Classification matrix								
		EMS1	3	-	0	0	0	0	-	100
		EMS3	0	-	3	0	0	0	-	100
		MB1	0	-	0	3	0	0	-	100
		MB4	0	-	0	0	3	0	-	100
		MB5	0	-	0	0	0	3	-	100
		Total	3	-	3	3	3	3	-	100
		Jack-knifed classification matrix								
		EMS2	3	-	0	0	0	0	-	100
		EMS3	0	-	3	0	0	0	-	100
	MB1	0	-	1	2	0	0	-	67	
	MB4	1	-	1	0	1	0	-	33	
	MB5	1	-	0	0	0	2	-	67	
	Total	5	-	5	2	1	2	-	73	
	Aug-Sep	Classification matrix								
		EMS1	2	0	0	0	0	-	0	67
		EMS2	0	2	0	0	0	-	1	67
		EMS3	0	0	3	0	0	-	0	100
		MB1	0	0	0	3	2	-	1	100
		MB4	1	0	0	0	1	-	0	33
MB6		0	1	0	0	0	-	1	33	
Total		3	3	3	3	3	-	3	67	
Jack-knifed classification matrix										
EMS1		0	0	0	0	2	-	1	0	
EMS2	0	2	0	0	0	-	1	67		
EMS3	0	0	3	0	0	-	0	100		
MB1	0	0	0	3	0	-	0	100		
MB4	0	0	0	2	0	-	1	0		
MB6	0	1	0	1	0	-	1	33		
Total	0	0	0	0	0	-	0	50		
Settled	Jul-Aug	Classification matrix								
		EMS1	3	1	0	0	-	0	-	100
		EMS2	0	2	0	0	-	0	-	67

Shell type	Time period	True site	Predicted site							% correct
			EMS1	EMS2	EMS3	MB1	MB4	MB5	MB6	
		EMS3	0	0	3	0	-	0	-	100
		MB1	0	0	0	3	-	0	-	100
		MB5	0	0	0	0	-	3	-	100
		Total	3	3	3	3	-	3	-	93
		Jack-knifed classification matrix								
		EMS1	1	1	0	1	-	0	-	33
		EMS2	1	2	0	0	-	0	-	67
		EMS3	0	1	2	0	-	0	-	67
		MB1	0	0	0	3	-	0	-	100
		MB5	2	0	1	0	-	0	-	0
		Total	4	4	3	4	-	0	-	53
	Aug-Sep	Classification matrix								
		EMS1	3	0	0	0	0	-	0	100
		EMS2	0	3	0	0	0	-	0	100
		EMS3	0	0	3	1	0	-	0	100
		MB1	0	0	0	2	0	-	1	67
		MB4	0	0	0	0	3	-	0	100
		MB6	0	0	0	0	0	-	2	67
		Total	3	3	3	3	3	-	3	89
		Jack-knifed classification matrix								
		EMS1	1	2	0	0	0	-	0	33
		EMS2	0	2	0	0	1	-	0	67
		EMS3	0	0	3	0	0	-	0	100
		MB1	0	0	1	2	0	-	0	67
		MB4	0	0	1	0	2	-	0	67
		MB6	0	0	0	1	0	-	2	67
		Total	1	4	5	3	3	-	2	67

Table S12. Validation results of recent (single year) and whole (multiple years) shell linear discriminant function analyses. Classification matrix indicates the predicted site from the model dataset. Jack-knifed classification matrix indicates the leave-one-out cross-validation used to test the robustness of the adult shell classification. Bold indicates % of total sites correctly classified

Shell type	True site	Predicted site									% correct	
		EMS1	EMS2	EMS3	EMS4	EMS5	MB1	MB2	MB3	MB8		
Recent	Classification matrix											
	EMS1	3	0	0	0	0	0	0	0	0	0	100
	EMS2	0	3	0	0	0	0	0	0	0	0	100
	EMS3	0	0	3	0	0	0	0	0	0	0	100
	EMS4	0	0	0	3	0	0	0	0	0	0	100
	EMS5	0	0	0	0	3	0	0	0	0	0	100
	MB1	0	0	0	0	0	3	0	0	0	0	100
	MB2	0	0	0	0	0	0	3	0	0	0	100
	MB3	0	0	0	0	0	0	0	3	0	0	100
	MB8	0	0	0	0	0	0	0	0	3	0	100
	Total	3	3	3	3	3	3	3	3	3	3	100
	Jack-knifed classification matrix											
	EMS1	3	0	0	0	0	0	0	0	0	0	100
EMS2	0	2	0	1	0	0	0	0	0	0	67	
EMS3	0	0	0	1	0	0	2	0	0	0	0	
EMS4	0	1	0	2	0	0	0	0	0	0	67	
EMS5	0	0	0	0	3	0	0	0	0	0	100	
MB1	0	0	0	0	0	2	0	0	1	0	67	
MB2	0	0	0	1	0	0	2	0	0	0	67	
MB3	0	0	0	0	0	0	0	3	0	0	100	
MB8	0	0	0	0	0	0	0	0	3	0	100	
Total	3	3	0	5	3	2	4	3	4	4	74	
Whole	Classification matrix											
	EMS1	3	0	0	0	0	0	0	0	0	0	100
	EMS2	0	2	0	0	0	0	0	0	0	0	67
	EMS3	0	0	3	0	0	0	0	0	0	0	100
	EMS4	0	0	0	3	0	0	0	0	0	0	100
	EMS5	0	0	0	0	3	0	0	0	0	0	100
	MB1	0	0	0	0	0	3	0	0	0	0	100
	MB2	0	1	0	0	0	0	3	0	0	0	100
	MB3	0	0	0	0	0	0	0	3	0	0	100
	MB8	0	0	0	0	0	0	0	0	3	0	100
	Total	3	3	3	3	3	3	3	3	3	3	96
	Jack-knifed classification matrix											
	EMS1	2	0	0	1	0	0	0	0	0	0	67
EMS2	0	2	0	0	0	0	1	0	0	0	67	

Shell type	True site	Predicted site									% correct
		EMS1	EMS2	EMS3	EMS4	EMS5	MB1	MB2	MB3	MB8	
	EMS3	0	0	1	0	1	0	0	0	1	33
	EMS4	1	0	0	2	0	0	0	0	0	67
	EMS5	0	1	0	0	2	0	0	0	0	67
	MB1	0	0	0	0	0	3	0	0	0	100
	MB2	0	2	0	0	0	0	1	0	0	33
	MB3	0	0	0	0	0	1	1	1	0	33
	MB8	0	0	0	0	0	0	0	0	3	100
	Total	3	5	1	3	3	4	3	1	4	63

Table S13. MANOVA (multivariate) and ANOVA (univariate) results in recent adult shell using trace element (TE) ratios used in the larval origin prediction analyses (i.e., TE ratios present in both larval and recent shell). Differences in multi-elemental (MANOVA) and individual (ANOVA) TE ratios among sites were used to confirm the use of adult shells as a proxy of natal TE ratios. Bold *p*-values are statistically significant

MANOVA	Pillai's Trace	Hypothesis df	Error df	<i>F</i>	<i>p</i>
All elements	2.55	35	80	2.37	<0.001
ANOVA		df	MS	<i>F</i>	<i>p</i>
Sr		7	0.21	3.35	0.02
Cu		7	12.66	8.08	0.008
Co		7	225201.00	3.98	0.010
Mn		7	22.37	1.08	0.42
Ni		7	127.81	1.08	0.42

Table S14. Validation results from the larval origin prediction linear discriminant function analysis using trace element ratios in recent adult shell. Classification matrix indicates the predicted site from the model dataset. Jack-knifed classification matrix indicates the leave-one-out cross-validation used to test the robustness of the recent shell classification. Bold indicates % of total sites correctly classified

True site	Predicted site								% correct
	EMS1	EMS2	EMS3	EMS4	EMS5	MB1	MB2	MB3	
Classification matrix									
EMS1	3	0	0	0	0	0	0	0	100
EMS2	0	3	0	0	0	0	0	0	100
EMS3	0	0	2	0	0	0	0	0	67
EMS4	0	0	0	3	0	0	0	0	100
EMS5	0	0	0	0	3	0	0	1	100
MB1	0	0	1	0	0	3	0	0	100
MB2	0	0	0	0	0	0	3	0	100
MB3	0	0	0	0	0	0	0	2	67
Total	3	3	3	3	3	3	3	3	92
Jack-knifed classification matrix									
EMS1	2	0	0	0	1	0	0	0	67
EMS2	0	2	1	0	0	0	0	0	67
EMS3	0	0	0	1	0	2	0	0	0
EMS4	0	0	0	3	0	0	0	0	100
EMS5	1	0	0	0	2	0	0	0	67
MB1	0	0	2	0	0	0	1	0	0
MB2	0	0	0	0	0	1	2	0	67
MB3	0	0	0	0	1	0	0	2	67
Total	3	2	3	4	4	3	3	2	54

Table S15. Standardized coefficients explaining the relative contribution of elements to discriminant among sites for the larval origin prediction linear discriminant function analysis using trace element ratios in recent adult shell. Percent variance explained indicates how much variation each linear discriminant explains for site separation

Shell type	Me:Ca	LD1	LD2	LD3	LD4	LD5
Recent shell	Sr	-4.43	-2.64	-1.39	0.25	-1.75
	Cu	-0.38	-0.07	0.51	0.14	0.02
	Co	0.01	-0.00	-0.00	-0.00	-0.00
	Mn	0.09	0.22	0.06	0.02	-0.16
	Ni	-0.11	0.04	-0.01	-0.09	0.02
	% variance explained	70.9	17.5	9.2	2.2	0.2