The following supplement accompanies the article

Comparison of larval development in domesticated and naturalized stocks of the Pacific oyster *Crassostrea gigas* exposed to high pCO_2 conditions

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	2015		2016	
	MBP	Willapa	MBP	Willapa
# eggs sampled	20000	20213	6489	omitted due to contamination
sum SFA	37.88	41.67	40.73	
Sum MUFA	29.51	29.99	26.91	
sum PUFA	31.04	26.78	30.55	
PUFA/SFA	0.82	0.64	0.75	
Sum n-3	18.46	14.82	19.36	
DHA/EPA	0.71	0.72	0.67	
Total per sample	67.65	73.92	28.10	
Mean lipid egg^{-1}	**3.38**	**3.66**	**4.33***	

Table S1: Summary lipid composition of fertilized egg pools in 2015 and 2016 from MBP and Willapa groups. Mean lipid egg^{-1} was significantly greater for MBP eggs in 2016 (*). Lipid composition, however was highly similar. Willapa egg samples from 2016 were removed from analysis due to contamination during collection (see methods).

				Day post fertilization						
				2	6	10	12	16	22	24
2015	MBP	Ambient	%	58.8(6.7)	29.2(5.9)	31.3(2.0)	-	17.3(3.0)	10.1(3.1)	-
			µm	81.8(1.2)	114.2(3.6)	154.8(5.9)	-	220(56.0)	568.2(18.4)	-
		High pCO_2	%	61.3(3.9)	31.6(11.6)	31.4(11.2)	-	16.6(5.0)	11.1(3.4)	-
			µm	79.6(3.6)	114.8(4.1)	154.6(9.8)	-	209.2(47.3)	593.9(31.5)	-
	Willapa	Ambient	%	67.4(13.9)	33.5(10.3)	31.2(8.1)	-	19.6(8.7)	12.3(6.7)	-
			µm	78.7(1.2)	111.4(1.6)	144.8(6.0)	-	216.7(49.2)	509.4(26.7)	-
		High pCO_2	%	71.7(11.3)	32.8(12.8)	30.1(10.2)	-	19.2(7.7)	11.3(7.9)	-
			µm	78.5(2.2)	112.7(1.7)	152.4(3.5)	-	208.1(40.6)	492.1(45.3)	-
2016	MBP	Ambient	%	44.6(6.0)	27.7(5.7)	-	18(2.6)	-	-	10.7(3.4)
			µm	80.7(0.9)	109.7(2.9)	156.3(4.9)	181.2(5.8)	-	-	634.2(43.1)
		High pCO_2	%	54.2(5.9)	33.6(7.3)	-	21.6(2.3)	-	-	3.5(2.4)
			µm	79.4(0.8)	106.1(3.6)	153.2(5.4)	177.4(8.0)	-	-	722.6(88.4)
	Willapa	Ambient	%	37.3(6.2)	27.9(5.2)	-	16.7(3.2)	-	-	8.2(2.2)
			µm	81.0(0.6)	104.3(2.3)	150.6(4.3)	164.5(5.2)	-	-	632.4(28.7)
		High pCO_2	%	38.2(5.2)	31(7.8)	-	17.8(2.7)	-	-	5.1(1.5)
			µm	79.7(0.7)	105.1(3.1)	143.6(8.2)	167.5(12.2)	-	-	616.6(86.5)

Table S2: Mean cumulative percent survival (%) and size (µm) of MBP and Willapa larvae reared in ambient and high pCO_2 seawater conditions in replicate experiments in 2015 and 2016. Means are averaged from n=5 and n=6 experimental replicates in 2015 and 2016, respectively.

$Cumulative\ survival \sim \beta_{Type}\ x\ \beta_{Treatment}\ x\ \beta_{Year}\ x\ \beta_{Day}$				
Coefficients	Estimate	SE	t-value	P-value
(Intercept)	7.30E-01	5.34E-02	13.663	**<2e-16**
Type = Willapa	3.12E-02	7.51E-02	0.415	0.678
Day	-3.45E-02	4.51E-03	-7.64	**5.48E-13**
Treatment = High pCO_2	6.76E-03	7.51E-02	0.09	0.928
Year = 2016	-6.42E-02	7.26E-02	-0.884	0.377
Willapa x Day	-1.94E-04	6.20E-03	-0.031	0.975
Willapa x High pCO_2	6.79E-03	1.06E-01	0.064	0.949
Day x High pCO_2	2.87E-04	6.20E-03	0.046	0.963
Willapa x 2016	-5.54E-02	1.02E-01	-0.541	0.589
Day x 2016	5.15E-03	6.01E-03	0.857	0.392
High pCO_2 x 2016	5.90E-02	1.02E-01	0.577	0.565
Willapa x Day x High pCO_2	-1.56E-03	8.64E-03	-0.18	0.857
Willapa x Day x 2016	4.45E-04	8.36E-03	0.053	0.958
Willapa x High pCO_2 x 2016	-5.51E-02	1.46E-01	-0.378	0.706
Day x High pCO_2 x 2016	-4.94E-03	8.36E-03	-0.591	0.555
Willapa x Day x High pCO_2 x 2016	4.75E-03	1.19E-02	0.401	0.689

Residual Std. Error = 0.186 on 235 degrees of freedom

Adjusted R^2 = 0.651

$F_{15,235}$ = 32.08 , p-value: 2.2 x 10^{-16}

Table S3: Summary table of linear model of cumulative survival of larvae from day 0 to 22 in 2015 and day 0 to 24 in 2016. Type III sum of squared residuals are reported for the fixed effects: broodstock type, seawater treatment, day post fertilization, year of experiment and all interactions between them. The random effect of culture replicate (Replicate) is used to account for multiple measurements. Reference level (intercept) is: Day=0, Type=MBP, Treatment=Ambient and Year=2015. Day is found as the only significant parameter in this model and when this model is submitted to bi-directional stepwise AIC selection, the final model of best fit is *Survival ~ Day*.

$$log(mean\ size) \sim \beta_{Type}\ x\ \beta_{Treatment}\ x\ \beta_{Year}\ x\ \beta_{Day}$$

Coefficients	Estimate	SE	t-value	P-value
(Intercept)	4.25E+00	7.12E-02	59.667	**<2e-16**
Type = Willapa	-2.67E-02	9.99E-02	-0.267	0.789
Day	7.42E-02	4.83E-03	15.37	**<2e-16**
Trt = High pCO_2	-2.53E-02	9.99E-02	-0.253	0.801
Year = 2016	4.42E-02	1.03E-01	0.429	0.668
Willapa x Age	-6.42E-04	6.65E-03	-0.096	0.923
Willapa x High pCO_2	3.11E-02	1.41E-01	0.221	0.825
Day x High pCO_2	8.64E-04	6.65E-03	0.130	0.897
Willapa x Year 2016	-3.94E-02	1.45E-01	-0.271	0.786
Day x Year 2016	-4.47E-03	6.82E-03	-0.655	0.513
High pCO_2 x Year 2016	-1.91E-02	1.45E-01	-0.131	0.896
Willapa x Age x High pCO_2	-1.61E-03	9.28E-03	-0.173	0.863
Willapa x Age x 2016	5.51E-03	9.52E-03	0.579	0.563
Willapa x High pCO_2 x 2016	6.45E-03	2.05E-01	0.031	0.975
Day x High pCO_2 x 2016	2.54E-03	9.52E-03	0.266	0.790
Willapa x Age x High pCO_2 x 2016	-2.78E-03	1.34E-02	-0.208	0.836

Residual Std. Error = 0.242 on 302 degrees of freedom

Adjusted R^2 = 0.858

$F_{15,302}$ = 128.8 , p-value: 2.2e-16

Table S4: Summary table of linear model of mean size of larvae (log transformed for normality) from day 0 to 22 in 2015 and day 0 to 24 in 2016. Type III sum of squared residuals are reported for the fixed effects: broodstock type, seawater treatment, day post fertilization, year of experiment and all interactions between them. Reference level (intercept) is: Age=0, Type=MBP, Treatment=Ambient and Year=2015. Day is found as the only significant parameter in this model and when this model is submitted to bi-directional stepwise AIC selection, the final model of best fit is *log(size) ~ Day*.

$$Survival \sim \beta_{Type} + \beta_{Treatment} + \beta_{Year} + \beta_{Type\ x\ Year}$$

Coefficients	Estimate	SE	t-value	P-value
(Intercept)	0.5772	0.02777	20.788	**2.00E-16**
Type = Willapa	0.09546	0.03536	2.699	**0.0103**
Treatment = High pCO_2	0.04616	0.02414	1.912	0.0634
Year = 2016	-0.08027	0.03386	-2.371	**0.0229**
Willapa x 2016	-0.2311	0.04839	-4.776	**2.66E-05**

Residual std. error: 0.079 on 38 degrees of freedom

Adjusted R-squared: 0.6786

$F_{4,38}$ = 23.17, p-value: 9.319e-10

Table S5: Summary table of linear model (lm) estimating percent survival of 48 hour D-larvae. Type III sum of squared residuals are reported for the fixed effects: broodstock type (Type), seawater treatment (Trt), year of experiment (Year) and an interaction of Type*Year (Type:Year). Reference level (Intercept) is MBP, Ambient and 2015 for Type, Trt and Year, respectively. A highly significant interaction of Willapa and Year ($p=2.66 \times 10^{-5}$) suggest this effect overshadows the independent effects of each of the contributing parameters.

$$\% \, normal \sim \beta_{Type} \; x \; \beta_{Treatment} \; x \; \beta_{Year}$$

Coefficients	Estimate	SE	t-value	P-value
(Intercept)	0.73546	0.02067	35.587	**< 2e-16**
Type = Willapa	0.03635	0.02923	1.244	0.222
Treatment = High pCO_2	-0.1326	0.02923	-4.537	**6.44E-05**
Year = 2016	0.02376	0.02798	0.849	0.402
Willapa x High pCO_2	0.06491	0.04133	1.570	0.125
Willapa x 2016	-0.05143	0.03957	-1.300	0.202
High pCO_2 x 2016	0.05063	0.03957	1.279	0.209
Willapa x High pCO_2 x 2016	-0.09293	0.0566	-1.642	0.11

Residual std. error: 0.046 on 35 degrees of freedom

Adjusted R-squared: 0.5737

$F_{7,35}$ = 9.075 , p-value: 2.392e-06

Table S6: Summary table of linear model (lm) estimating percent normal larvae among 48 hour D-larvae. Type III sum of squared residuals are reported for the model with fixed effects: broodstock type, seawater treatment, year of experiment and all 2-way and 3-way interactions between them. Reference level (Intercept) is MBP, Ambient and 2015 for Type, Trt and Year, respectively. While the full model was selected as best fit for the data via stepAIC, (Venables and Ripley, 2002), only seawater treatment (High pCO_2) is a significant effect, without interactions.

$$Average\ size \sim \beta_{Type} + \beta_{Treatment} + \beta_{Year} + \beta_{Type\ x\ Year}$$

Coefficients	Estimate	SE	t-value	P-value
(Intercept)	81.3443	0.5622	144.678	**< 2e-16**
Treatment = High pCO_2	-1.2881	0.4839	-2.662	**0.01123**
Type = Willapa	-2.1416	0.7177	-2.984	**0.00489**
Year = 2016	-0.6901	0.6872	-1.004	0.32144
Willapa x 2016	2.4682	0.9718	2.54	**0.01519**

Residual std. error: 1.605 on 39 degrees of freedom

Adjusted R-squared: 0.2388

$F_{4,39}$ = 4.373 , p-value: 0.005125

Table S7: Summary table of linear model estimating average shell height (µm) of larvae at 48 hours. Type III sum of squared residuals are reported for the model with fixed effects: seawater treatment, broodstock type, year of experiment and an interaction of Type and Year. High pCO_2 had significant negative effects across both broodstock types in both years. Willapa is a significant as a primary coefficient (est = -2.14 µm) as well as in an interaction with Year (+2.47). This indicates that Willapa larvae at 48 hours were significantly smaller in 2015 but had similar average size in 2016.

A

$$Total\ normal\ larvae \sim \beta_{Type} + \beta_{Year} + \beta_{Type\ x\ Year}$$

Coefficients	Estimate	SE	t-value	P-value
(Intercept)	0.40101	0.0224	17.9210	**< 2e-16**
Type = Willapa	0.11495	0.0317	3.6330	**0.000807**
Year = 2016	-0.02912	0.0303	-0.9610	0.342379
Willapa x 2016	-0.22263	0.0433	-5.1430	**7.97E-06**

Residual std. error: 0.071 on 39 degrees of freedom

Adjusted R-squared: 0.6046

$F_{3,39}$ = 22.41 , p-value: 1.338e-08

B

Analysis of Variance Table

Model 1: $Total\ normal\ larvae \sim \beta_{Type} + \beta_{Year} + \beta_{Treatment} + \beta_{Type\ x\ Year}$

Model 2: $Total\ normal\ larvae \sim \beta_{Type} + \beta_{Year} + \beta_{Type\ x\ Year}$

Model	Residual DF	Residual Sum of Squares	DF	Sum of Squares	F	P-value
1	38	0.1912				
2	39	0.19528	-1	-0.00408	0.8103	0.3737

Table S8:

A) Summary table of linear model estimating total percent normal larvae at 48 hours, from total stocked at fertilization. Type III sum of squared residuals are reported for the model with fixed effects: broodstock type, year of experiment and an interaction of type and year. Reference level (Intercept) is MBP and 2015 for Type and Year, respectively. The highly significant (and negative) interaction between Willapa and 2016 fixed effects (p=7.97 x 10^{-6}) suggests the main (and positive) effect of Willapa in 2015 is, while significant, relatively minor.

B) Analysis of variance table comparing a model including $\beta_{Treatment}$ and the model in A), above, chosen by AIC stepwise selection. The large p-value (0.3737) indicates that including '*treatment*' effects in this model is not justified .

$$Survival\ Day\ 2 - Day\ 6 \sim \beta_{Type} + \beta_{Treatment} + \beta_{Year} + \beta_{Survival\ Day\ 0-2}$$

Coefficients	Estimate	SE	t value	P-value
(Intercept)	0.81816	0.16238	5.039	**1.18E-05**
Type = Willapa	0.05261	0.04639	1.134	0.2638
Treatment = High pCO_2	0.0263	0.0474	0.555	0.5823
Year = 2016	0.10071	0.06586	1.529	0.1345
Survival Day0-Day2	-0.56197	0.24377	-2.305	**0.0267**

Residual std. error: 0.1503 on 38 degrees of freedom

Adjusted R-squared: 0.3637

$F_{4,38}$ = 7.002 , p-value: 0.0002515

Table S9: Summary table of the linear model estimating the survival of larvae from day 2 to 6 post fertilization. Type III sum of squared residuals are reported for the model with fixed effects: broodstock type, seawater treatment, year of experiment and survival from fertilization from Day 0 to Day 2 of the same culture unit. Initial survival to day 2 was significantly negatively correlated to subsequent survival from day 2 to day 6 (p=0.267).

$$Average\ Day\ 6\ size\ (\mu m) \sim \beta_{Type} + \beta_{Treatment} + \beta_{Year} + \beta_{Survival\ Day\ 0-2} + \beta_{Type\ x\ Treatment} + \beta_{Type\ x\ Year} + \beta_{Treatment\ x\ Year} + \beta_{Type\ x\ Survival\ Day\ 0-2} + \beta_{Type\ x\ Treatment\ x\ Year}$$

Coefficients	Estimate	SE	t-value	P-value
(Intercept)	102.1317	6.9517	14.692	**4.91E-16**
Type = Willapa	11.0641	8.6345	1.281	0.209
Treatment = High pCO_2	0.1181	1.8773	0.063	0.9502
Year = 2016	-2.0811	2.2468	-0.926	0.361
Survival Day0-Day2	20.4497	11.6098	1.761	**0.0874**
Willapa x High pCO_2	1.2945	2.6581	0.487	0.6295
Willapa x 2016	-5.815	3.5961	-1.617	0.1154
High pCO_2 x 2016	-5.6919	2.6645	-2.136	**0.0402**
Willapa x Survival Day0-Day2	-23.1521	13.7357	-1.686	0.1013
Willapa x High pCO_2 x 2016	5.6417	3.7095	1.521	0.1378

Residual std. error: 2.934 on 33 degrees of freedom

Adjusted R-squared: 0.6128

$F_{9,33}$ = 8.384 , p-value: 2.231e-06

Table S10: Summary table of the linear model estimating the average size (µm) of larvae at day 6 post fertilization. Type III sum of squared residuals are reported for the model with fixed effects: broodstock type, seawater treatment, year of experiment and survival from fertilization from Day 0 to Day 2 of the same culture unit. Multiple interactions between these parameters are also retained in the optimal fit of this model (by forward/backward AIC selection). Larvae reared in High pCO_2 groups in 2016 were ~5% smaller than other groups (est -5.7 µm, p=0.04) but survival from day 0 to 2 was weakly (p=0.087) but positively correlated to size at day 6 (est +20.5 µm).

$$Cumulative\ Survival \sim \beta_{Day} + \beta_{Year}$$

Coefficients	Estimate	SE	t-value	P-value
(Intercept)	41.9495	2.0770	20.197	**<2e-16**
Day	-1.3447	0.1668	-8.063	**6.32e-13**
Year = 2016	-4.2441	1.3708	-3.096	**0.00244**

Residual std. error: 7.244 on 120 degrees of freedom

Adjusted R-squared: 0.351

$F_{2,120}$ = 33.99 , p-value: 2.016e-12

Table S11. Summary table of linear model estimating percent cumulative survival of larvae from day 6 to 16. Type III sum of squared residuals are reported for the fixed effects: day post fertilization (Day) and year of experiment. Reference level (intercept) is Day 0 in 2015, outside the range of data used to create the model (Day 6-16). The significant effect of 'Year = 2016' in this model suggests these data are best fit by a parallel lines model, with 2016 having a lower intercept but not a reduced survival rate. * Note: the estimate for intercept (Day 0, 2015) is ~42%; much lower than the actual 100%. This is due to the heterogeneous survival pattern seen in larvae during these experiments: mortality rate in day 0-6 is much greater than subsequent stages. Survival rates over this timeframe are sufficiently linear for this model, however prediction intervals outside of this data range are unreliable.

$$Average\ size\ (\mu m) \sim \beta_{Day}$$

Coefficients	Estimate	SE	t-value	P-value
(Intercept)	47.305	5.9488	7.952	**4.48E-13**
Day	10.384	0.5259	19.748	**< 2e-16**

Residual std. error: 24.1 on 147 degrees of freedom

Adjusted R-squared: 0.7244

$F_{1,147}$ = 390 , p-value: < 2.2e-16

Table S12. Summary of linear model estimating the effect of age (days post fertilization) on larval size (µm) to pediveliger stage (day 16). After forwards/backwards stepwise AIC selection, all other parameters (seawater pCO_2, broodstock type and year of experiment) were eliminated as insignificant.

$$Total\ survival\ over\ settlement \sim \beta_{Type}\ x\ \beta_{Treatment}\ x\ \beta_{Year}$$

Coefficients	Estimate	SE	t-value	P-value
(Intercept)	57.47	0.061	9.404	**7.38E-11**
Treatment = High pCO_2	9.07	0.082	1.106	0.277
Type = Willapa	2.44	0.082	0.298	0.768
Year = 2016	1.16	0.079	0.146	0.884
High pCO_2 x Willapa	-16.44	0.113	-1.459	0.154
High pCO_2 x 2016	-49.43	0.110	-4.475	**8.59E-05**
Willapa x 2016	-11.72	0.108	-1.083	0.287
High pCO_2 x Willapa x 2016	37.29	0.154	2.425	**0.021**

Residual std. error: 12.22 on 33 degrees of freedom

Adjusted R-squared: 0.5886

$F_{7,33}$ = 9.176 , p-value: 2.947e-06

Table S13: Summary table of linear model estimating percent survival of larvae from pediveliger stage to day 22 in 2015 and 24 in 2016. Type III sum of squared residuals are reported for the model with fixed effects: broodstock type (Type), seawater treatment (Trt), year of experiment (Year) and all 2-way and 3-way interactions between them. Reference level (Intercept) is MBP, Ambient and 2015 for Type, Trt and Year, respectively. High CO_2 * 2016 had a strong interactive effect (p=8.59 x 10^{-5}) and the three way interaction 'High CO_2 x Willapa x 2016' was significant (p=0.021) although the net estimated effect (+ 37.3%) is nearly offset by the independent and 2 way interactions beneath it: High CO_2 (+9.1%) + Willapa (+2.4) + 2016 (1.2%) + High CO_2*Willapa (-49.4%) = -36.7%

$$\% \, Settlement \sim \beta_{Type} \; x \; \beta_{Treatment} \; x \; \beta_{Year}$$

Coefficients	Estimate	SE	t-value	P-value
(Intercept)	32.88	4.40	7.466	**1.60E-08**
Trt = High pCO_2	3.51	5.91	0.594	0.55681
Type = Willapa	-12.99	5.91	-2.199	**0.03607**
Year = 2016	18.24	5.69	3.209	**0.00313**
High pCO_2 x Willapa	-4.99	8.12	-0.615	0.54281
High pCO_2 x 2016	-45.40	7.96	-5.704	**2.57E-06**
Willapa x 2016	-2.53	7.80	-0.324	0.74938
High pCO_2 x Willapa x 2016	19.13	11.08	1.726	0.12782

Residual std. error: 8.863 on 33 degrees of freedom
Adjusted R-squared: 0.7264
$F_{7,33}$ = 16.17 , p-value: 5.079e-09

Table S14:

Summary table of linear model (lm) estimating percent metamorphosis and settlement (% Settlement) of pediveliger larvae to juvenile spat on day 22 in 2015 and day 24 in 2016. Type III sum of squared residuals are reported for the model with fixed effects: broodstock type, seawater treatment, year of experiment and all 2-way and 3-way interactions between them. Reference level (Intercept) is MBP, Ambient and 2015 for Type, Treatment and Year, respectively.

A) Year= 2015

$$\% \, Settlement \sim \beta_{Type} \; x \; \beta_{Treatment}$$

Coefficients	Estimate	SE	t-value	P-value
(Intercept)	32.88	3.89	8.44	**4.4E-07**
Trt = High pCO_2	3.51	5.22	0.67	0.5122
Type = Willapa	-12.99	5.22	-2.49	**0.0251**
High pCO_2 x Willapa	-4.99	7.18	-0.70	0.4974

Residual std. error: 7.78 on 15 degrees of freedom
Adjusted R-squared: 0.4822
$F_{3,15}$ = 6.587 , p-value: 0.0047

B) Year= 2016

$$\% \, Settlement \sim \beta_{Type} \; x \; \beta_{Treatment}$$

Coefficients	Estimate	SE	t-value	P-value
(Intercept)	51.12	3.95	12.95	**1.47E-10**
Trt = High pCO_2	-41.89	5.85	-7.16	**1.16E-06**
Type = Willapa	-15.52	5.58	-2.78	**0.0124**
High pCO_2 x Willapa	12.43	8.28	1.50	0.1507

Residual std. error: 9.669 on 18 degrees of freedom
Adjusted R-squared: 0.7905
$F_{3,18}$ = 27.42 , p-value: 6.256e-07

Table S15: Summary table of linear models estimating % settlement for experiments in 2015 (A) and 2016 (B) separately (in comparison with the combined analysis in **Table S14**). Type III sum of squared residuals are reported for the models with fixed effects: broodstock type, seawater treatment, and a 2-way interaction between Treatment x Type. Reference level (Intercept) is: Type = MBP, Treatment = ambient. In both years, MBP pediveliger larvae yielded more spat, on average, than Willapa counterparts and in 2016, high pCO_2 treatment effects significantly reduced settlement rate in both groups.

A) Model summary

$$Spat\ size\ (\mu m) \sim \beta_{Type} + \beta_{Treatment} + \beta_{Year} + \beta_{Survival} + \beta_{Treatment\ x\ Type} + \beta_{Year\ x\ Survival}$$

Coefficients	Estimate	SE	t value	P-value
(Intercept)	513.16	49.74	10.317	**5.22E-12**
Treatment = High pCO_2	25.1	23.32	1.076	0.28934
Type = Willapa	-39.41	18.68	-2.11	**0.04227**
Year = 2016	255.49	56.37	4.533	**6.88E-05**
Survival	0.859	80.94	1.061	0.296
High pCO_2 x Willapa	-64.72	27.99	-2.312	**0.02697**
2016 x Survival	-3.08	1.04	-2.967	**0.00547**

Residual std. error: 41.82 on 34 degrees of freedom
Adjusted R-squared: 0.7748
$F_{6,34}$ = 23.94 , p-value: 7.119e-11

B) Predicted estimates (µm)

Type	Treatment	Year	Fitted est.	Lower	Upper
MBP	Ambient	2015	562.53	470.87	645.20
MBP	High CO_2	2015	595.42	504.28	686.57
Willapa	Ambient	2015	525.22	435.00	615.44
Willapa	High CO_2	2015	497.27	388.77	569.76
MBP	Ambient	2016	637.96	547.69	728.23
MBP	High CO_2	2016	753.03	661.88	844.17
Willapa	Ambient	2016	619.22	529.44	709.00
Willapa	High CO_2	2016	623.10	532.60	713.59

Table S16: A) Summary table of linear model estimating mean shell length of spat (µm) at day 22 in 2015 and 24 in 2016. Type III sum of squared residuals are reported for the model with fixed effects: broodstock type, seawater treatment, year of experiment, survival from day 16-22(24), two 2-way interactions: Treatment x Type and Year x Survival. Reference level (Intercept) is: Type = MBP, Treatment = ambient, Year = 2015, Survival = 100%. B) Estimated values from model in A) above. Estimates incorporate parameter coefficients from treatment combination as well as mean survival of the group. Spat were much larger in 2016, owing to an extended culture period but Willapa broodstock produced significantly smaller larvae than MBP in both ambient and high pCO_2 conditions in both years. Survival rate of the culture replicate was negatively correlated to the mean size of spat therein, with an estimated correlation of -3.08 µm (% survival^{-1}).

A) Year= 2015

$$Spat\ size\ (\mu m) \sim \beta_{Type} + \beta_{Treatment} + \beta_{Survival} + \beta_{Treatment\ x\ Type}$$

Coefficients	Estimate	SE	t-value	P-value
(Intercept)	505.15	38.79	13.02	**3.25E-09**
Type = Willapa	-61.53	20.58	-2.99	**0.0097**
Trt = High pCO_2	15.71	21.27	0.74	0.4720
Survival	1.10	0.62	1.77	0.0986*
High pCO_2 x Willapa	-24.89	29.99	-0.83	0.4210

Residual std. error: 30.59 on 14 degrees of freedom
Adjusted R-squared: 0.6624
$F_{4,14}$ = 9.828 , p-value: 0.00053

B) Year= 2016

$$Spat\ size\ (\mu m) \sim \beta_{Type} + \beta_{Treatment} + \beta_{Survival} + \beta_{Treatment\ x\ Type}$$

Coefficients	Estimate	SE	t-value	P-value
(Intercept)	783.66	61.57	12.73	**4.07E-10**
Type = Willapa	-25.39	30.07	-0.84	0.4102
Trt = High pCO_2	17.49	50.04	0.35	0.7310
Survival	-2.55	0.99	-2.57	**0.0198**
High pCO_2 x Willapa	-89.40	47.22	-1.89	0.0755*

Residual std. error: 49.58 on 18 degrees of freedom
Adjusted R-squared: 0.5812
$F_{4,17}$ = 8.286 , p-value: 0.0006724
**marginally significant (0.05 < p < 0.1)*

Table S17: Summary table of linear models estimating mean shell length of spat (µm) for experiments in 2015 (A) and 2016 (B) separately (in comparison with the combined analysis in **Table S16**). Type III sum of squared residuals are reported for the models with fixed effects: broodstock type, seawater treatment, survival and a 2-way interaction between Treatment x Type. Reference level (Intercept) is: Type = MBP, Treatment = ambient, Survival = 100%. In 2015, MBP spat were ~61 µm larger, on average, than Willapa spat (p=0.0097) with no significant effect of seawater treatment (p= 0.472). In 2016, the overall difference in mean spat size between MBP and Willapa groups was reduced in ambient conditions (~25.4 µm larger in MBP, p=0.410) but was increased in high pCO_2 replicates (~89.4 µm larger in MBP, p=0.0755). Survival also played a more significant role in determining spat size in 2016, with an average reduction of ~2.55 µm in average spat size for every 1% increase in survival over the settlement period (p=0.0198).

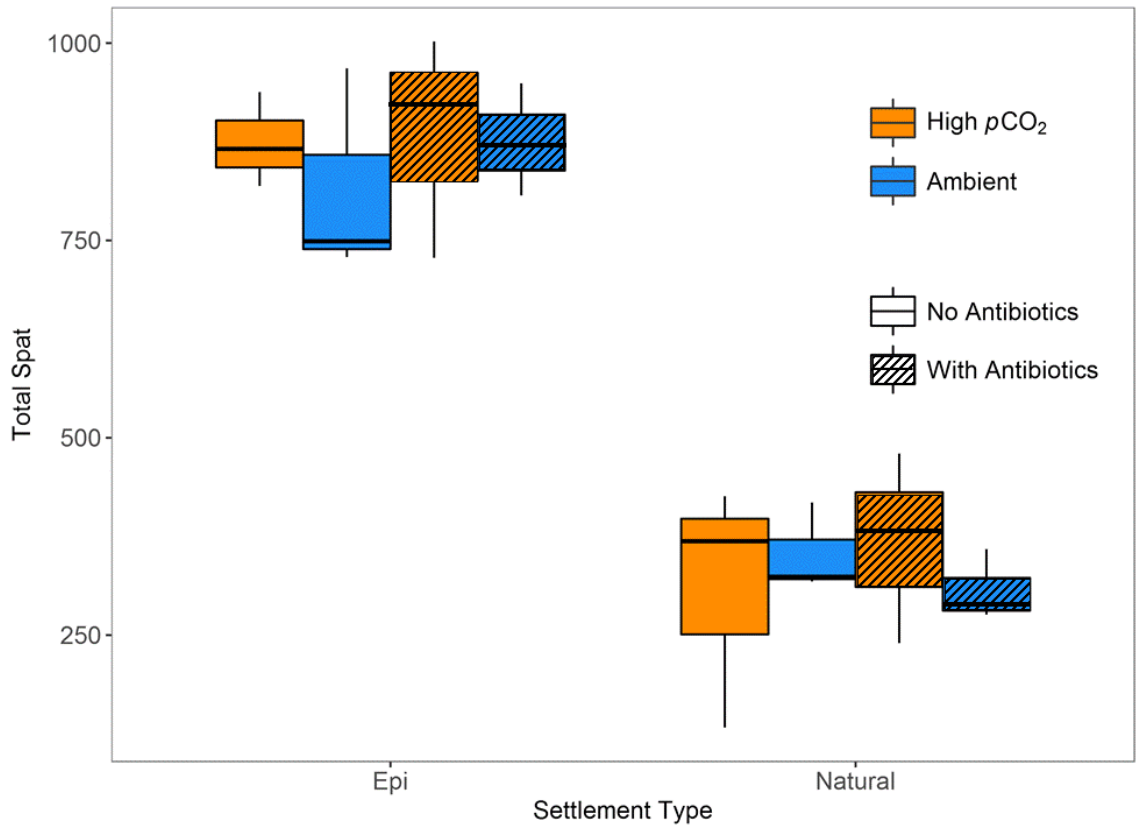

Figure S1. Comparing epinephrine (Epi) induced versus natural settlement in low (~400) and high (~1600) pCO_2 seawater with and without antibiotics.

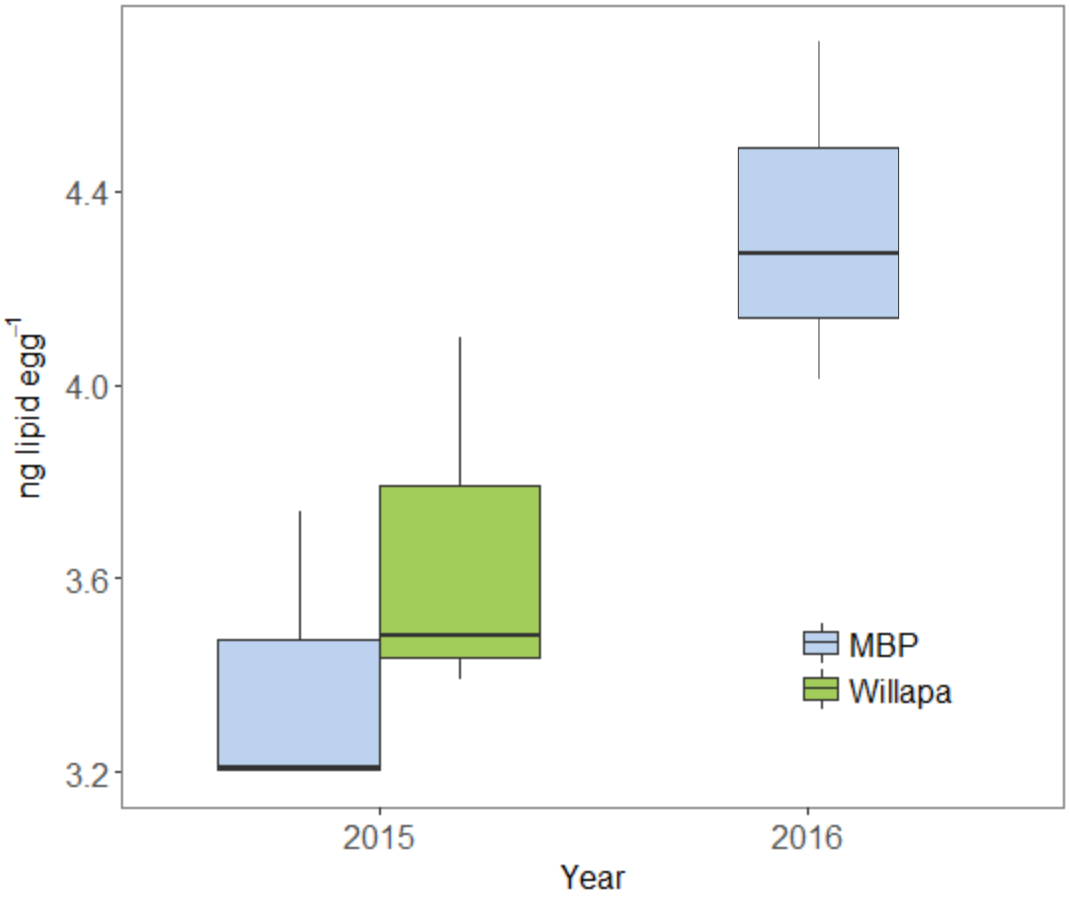

Figure S2. Mean lipid content (ng egg^{-1}) of eggs for MBP and Willapa egg pools in 2015 and MBP egg pool in 2016.

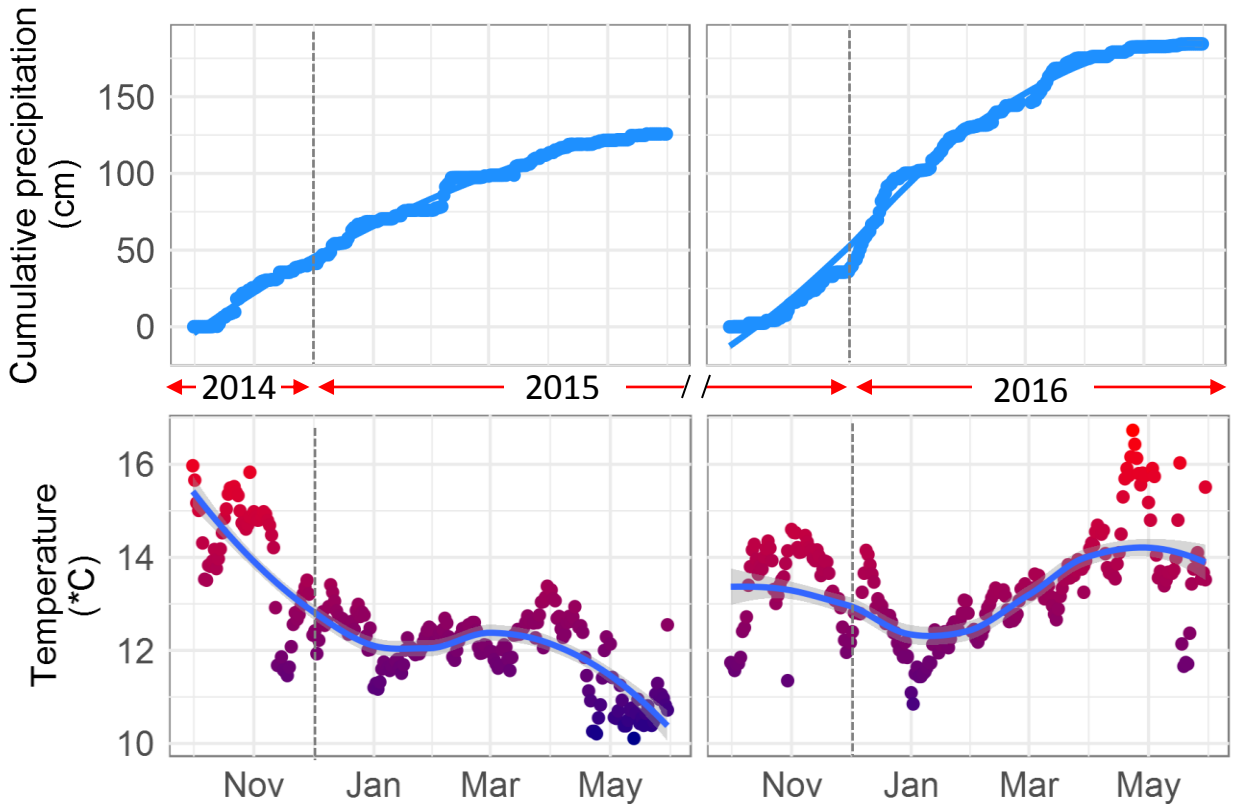

Figure S3. Cumulative precipitation and seawater temperatures for Yaquina Bay, Oregon during the 2015 and 2016 oyster conditioning seasons. 'Conditioning season' is defined here as the winter period during which oysters reabsorb old gonad tissue and begin gametogenesis anew, denoted by red arrows and dashed vertical lines to delineate seasons. Warmer seawater temperatures and higher cumulative precipitation in 2016 were potentially causative factors contributing to poorer overall gonad quality observed in broodstock for this year's spawn.

Precipitation data was obtained from NOAA weather stations at: https://www.ncdc.noaa.gov/cdo-web/ station ID: ZIP:97365.

Seawater temperature data was obtained from NOAA's national data buoy center at: http://www.ndbc.noaa.gov/ station ID: SBE03-9435380

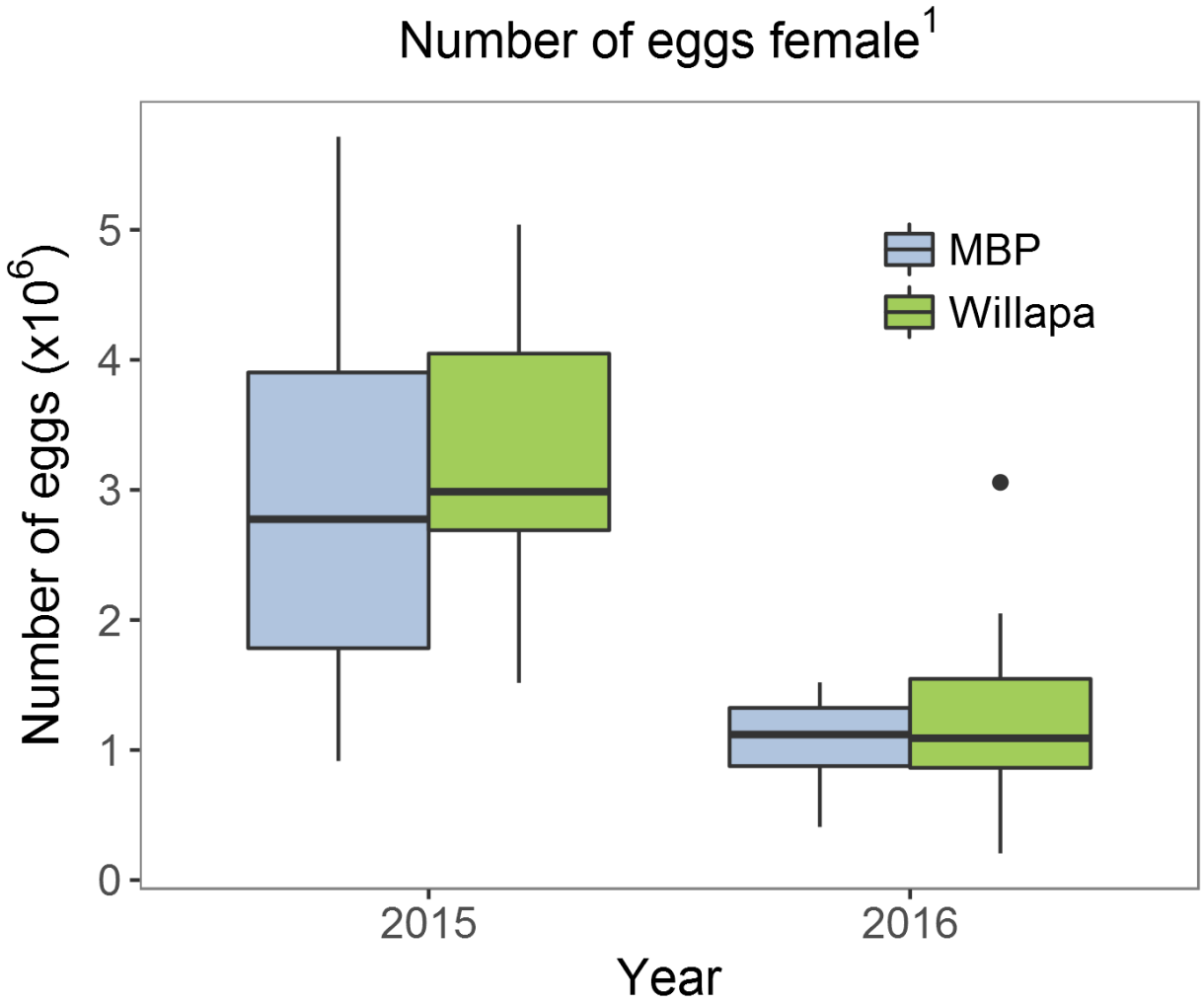

Figure S4. Average number of eggs female^{-1} in MBP and Willapa broodstock used in 2015 and 2016

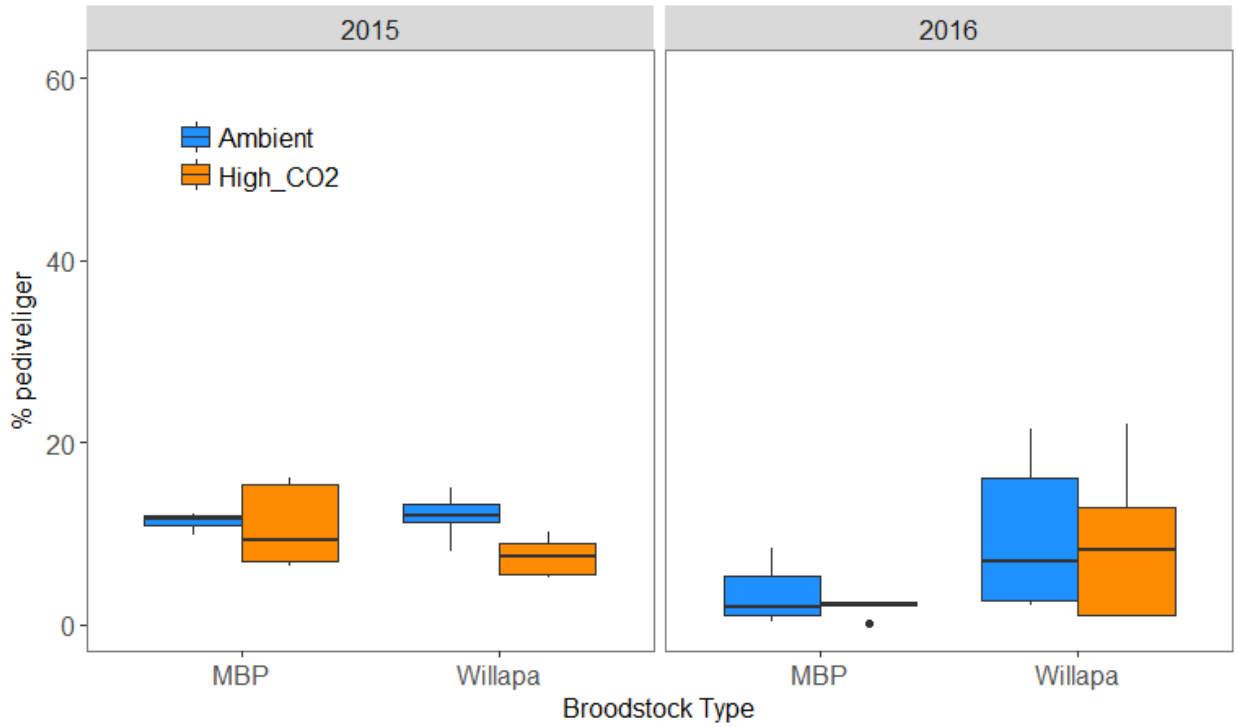

Figure S5. Percentage of pediveliger 'eyed' larvae at the conclusion of the experiments: day 22 in 2015, day 24 in 2016. Calculated as: *% pediveliger larvae / total larvae at day 16*