

Table S1. Treatment conditions and carbon chemistry for $\text{CO}_2 \times$ temperature experiments shown as mean (\pm standard deviation) temperature ($^{\circ}\text{C}$), pH_{NIST} , salinity, P_{O_2} (kPa), P_{CO_2} and f_{CO_2} (μatm), and A_{T} , DIC, and CO_3^{2-} ($\mu\text{mol kg}^{-1}$) measured over the course of each experiment for each corresponding target treatment. Measurements are described in the methods section.

Exp.	Target Temp	Measured Temp	Target P_{CO_2}	Measured P_{CO_2}	Measured pH	Sal.	P_{O_2}	A_{T}	DIC	f_{CO_2}	CO_3^{2-}
1	17	16.9 ± 0.3	400	368 ± 18	8.17 ± 0.12	30	21.2	2038 ± 17	1851 ± 8	367 ± 18	135 ± 6
		16.9 ± 0.3	2200	2037 ± 188	7.49 ± 0.13	30	21.2	2031 ± 12	2058 ± 21	2030 ± 188	32 ± 2
	24	23.5 ± 0.3	400	427 ± 29	8.13 ± 0.09	30	21.2	2042 ± 11	1838 ± 16	426 ± 29	150 ± 7
		23.6 ± 0.3	2200	2190 ± 277	7.49 ± 0.12	30	21.2	2041 ± 11	2048 ± 7	2183 ± 276	5 ± 5
2	17	16.9 ± 0.3	400	341	8.17 ± 0.04	31	22.0 ± 0.4	2059	1852	340.0	147.3
		17.1 ± 0.2	2200	1869	7.47 ± 0.09	31	23.0 ± 0.3	2023	2037	1862.6	35.3
		17.0 ± 0.2	4200	3936	7.22 ± 0.07	31	23.2 ± 0.3	2044	2159	3921.6	17.8
	20	20.2 ± 0.3	400	373	8.13 ± 0.06	31	24.5 ± 0.3	2038	1827	371.5	150.3
		19.9 ± 0.2	2200	2184	7.51 ± 0.05	31	23.8 ± 0.4	2039	2060	2176.7	34.8
	24	19.9 ± 0.2	4200	3996	7.20 ± 0.09	31	23.4 ± 0.3	2059	2161	3982.0	20.2
		24.1 ± 0.2	400	426	8.20 ± 0.05	31	23.6 ± 0.5	2044	1828	424.2	154.9
		23.9 ± 0.2	2200	2043	7.52 ± 0.04	31	23.8 ± 0.5	2022	2020	2036.7	42.6
3	17	17.4 ± 0.2	400	322 ± 12	8.22 ± 0.01	31	21.5 ± 0.3	2054 ± 8	1838 ± 26	321 ± 12	153 ± 2
		17.6 ± 0.3	2200	1952 ± 39	7.51 ± 0.01	31	22.4 ± 0.4	2047 ± 20	2066 ± 21	1945 ± 39	35 ± 1
		17.4 ± 0.2	4200	4056 ± 204	7.20 ± 0.02	31	22.9 ± 0.4	2053 ± 24	2174 ± 16	4042 ± 203	18 ± 1
	20	19.7 ± 0.2	400	345 ± 15	8.20 ± 0.02	31	23.6 ± 0.4	2048 ± 29	1833 ± 3	345 ± 15	160 ± 6
		19.6 ± 0.3	2200	1964 ± 109	7.51 ± 0.03	31	22.6 ± 0.4	2031 ± 14	2039 ± 10	1957 ± 108	38 ± 2
	24	19.7 ± 0.2	4200	4066 ± 227	7.21 ± 0.02	31	22.1 ± 0.5	2058 ± 6	2153 ± 37	4063 ± 226	20 ± 1
		23.7 ± 0.2	400	331 ± 14	8.22 ± 0.02	31	22.0 ± 0.5	2044 ± 9	1798 ± 8	330 ± 14	185 ± 5
		23.7 ± 0.3	2200	2157 ± 92	7.49 ± 0.02	31	22.4 ± 0.4	2048 ± 22	2050 ± 25	2151 ± 92	42 ± 1
4	24	23.6 ± 0.2	4200	4339 ± 169	7.20 ± 0.02	31	23.2 ± 0.4	2059 ± 51	2140 ± 8	4325 ± 169	22 ± 1
		24.3 ± 0.4	400	389 ± 23	8.19 ± 0.02	32	21.2	2137 ± 3	1897 ± 13	388 ± 23	175 ± 8
		24.1 ± 0.2	2200	2265 ± 228	7.50 ± 0.04	32	21.2	2151 ± 14	2156 ± 27	2258 ± 227	43 ± 4
	28	24.2 ± 0.3	4200	4432 ± 180	7.21 ± 0.02	32	21.2	2130 ± 27	2230 ± 25	4418 ± 179	23 ± 1
		28.2 ± 0.2	400	350 ± 19	8.23 ± 0.02	32	21.2	2157 ± 24	1857 ± 29	348 ± 19	215 ± 4
		28.1 ± 0.2	2200	2439 ± 84	7.48 ± 0.02	32	21.2	2176 ± 50	2172 ± 48	2431 ± 83	49 ± 2
		28.2 ± 0.3	4200	4720 ± 217	7.20 ± 0.03	32	21.2	2155 ± 20	2244 ± 18	4714 ± 204	26 ± 1

Table S2. Treatment conditions and carbon chemistry for $\text{CO}_2 \times$ oxygen experiments shown as mean (\pm standard deviation) temperature ($^{\circ}\text{C}$), pH_{NIST} , P_{O_2} (kPa), salinity, P_{CO_2} and f_{CO_2} (μatm), and A_{T} , DIC, and CO_3^{2-} ($\mu\text{mol kg}^{-1}$) measured over the course of each experiment for each corresponding target treatment. Measurements are described in the methods section. The target temperature for all treatments was 24°C .

Exp.	Measured Temp	Target P_{O_2}	Measured P_{O_2}	Target P_{CO_2}	P_{CO_2}	Measured pH	Sal.	A_{T}	DIC	f_{CO_2}	CO_3^{2-}
5	24.7 ± 0.4		23.7 ± 0.3	400	370 ± 1	8.18 ± 0.02	30	2001 ± 6	1769 ± 5	369 ± 1	165.2 ± 0.5
	24.5 ± 0.3	24.0	23.3 ± 0.3	2200	1826 ± 7	7.56 ± 0.1	30	2005 ± 8	1990 ± 8	1821 ± 7	46.7 ± 0.2
	24 ± 0.6		23.1 ± 0.3	4200	4368 ± 19	7.19 ± 0.07	30	1998 ± 9	2099 ± 9	4354 ± 19	20.3 ± 0.1
	24.6 ± 0.4		12.4 ± 1.2	400	439 ± 2	8.12 ± 0.04	30	1996 ± 7	1793 ± 6	437 ± 2	145.8 ± 0.5
	24.7 ± 0.4	12.0	12.1 ± 1.2	2200	2338 ± 5	7.46 ± 0.06	30	2002 ± 4	2015 ± 4	2330 ± 5	37.5 ± 0.1
	24.2 ± 0.5		12.3 ± 0.9	4200	4119 ± 17	7.22 ± 0.03	30	2003 ± 8	2093 ± 8	4105 ± 16	21.7 ± 0.1
	24.9 ± 0.3		8.2 ± 1.2	400	400 ± 1	8.15 ± 0.05	30	2004 ± 3	1783 ± 3	399 ± 1	157.8 ± 0.2
	24.2 ± 0.5	7.5	8.1 ± 1.2	2200	2189 ± 4	7.48 ± 0.08	30	2010 ± 3	2017 ± 3	2182 ± 4	39.3 ± 0.1
6	24.3 ± 0.4		7.5 ± 0.9	4200	4337 ± 36	7.2 ± 0.05	30	2014 ± 17	2112 ± 18	4323 ± 36	21 ± 0.2
	24.4 ± 0.3		23.5 ± 0.3	400	385 ± 2	8.17 ± 0.08	30	2062 ± 11	1829 ± 10	384 ± 2	167.5 ± 0.9
	24.7 ± 0.3	24.0	23.7 ± 0.3	2200	2173 ± 22	7.5 ± 0.07	30	2060 ± 21	2062 ± 21	2166 ± 22	42.2 ± 0.4
	24.4 ± 0.4		23.2 ± 0.3	4200	4539 ± 55	7.19 ± 0.11	30	2064 ± 25	2167 ± 26	4524 ± 55	21.1 ± 0.3
	24.4 ± 0.4		12.7 ± 0.9	400	505 ± 1	8.07 ± 0.09	30	2046 ± 4	1861 ± 4	503 ± 1	137.2 ± 0.3
	24.4 ± 0.3	12.0	12.4 ± 1.2	2200	2157 ± 12	7.5 ± 0.05	30	2055 ± 12	2057 ± 12	2151 ± 12	42 ± 0.2
	24.4 ± 0.4		12.4 ± 1.2	4200	4512 ± 20	7.19 ± 0.07	30	2060 ± 9	2162 ± 10	4498 ± 20	21.2 ± 0.1
	24 ± 0.4		9.3 ± 1.5	400	520 ± 5	8.06 ± 0.09	30	2050 ± 19	1871 ± 18	518 ± 5	133.3 ± 1.3
	24.1 ± 0.4	9.0	9.0 ± 0.9	2200	2151 ± 19	7.5 ± 0.05	30	2039 ± 17	2043 ± 18	2144 ± 18	41 ± 0.4
	24.2 ± 0.5		9.0 ± 0.9	4200	4473 ± 64	7.19 ± 0.06	30	2053 ± 29	2155 ± 31	4459 ± 64	21 ± 0.3

Table S3. Coefficient estimates, t-values, and p-values from multiple linear regression models of square-root transformed metabolic rates of *M. menidia* embryos and larvae.

Stage	Predictor Variable	Coefficient Estimate (\pm s.e.m.)	t	p
Embryos	P_{CO_2}	1.5e-5 (\pm 8.2e-6)	1.82	0.070
	Temp	4.5e-3 (\pm 9.0e-4)	4.99	<0.001
	$P_{CO_2} \times Temp$	-6.8e-7 (\pm 3.6e-7)	-1.90	0.059
Larvae	P_{CO_2}	-1.8e-5 (\pm 1.4e-5)	-1.32	0.189
	Temp	1.3e-2 (\pm 1.6e-3)	7.86	<0.001
	$P_{CO_2} \times Temp$	7.6e-7 (\pm 6.2e-7)	1.22	0.224
Embryos	P_{CO_2}	-7.2e-6 (\pm 4.0e-6)	-1.81	0.071
	P_{O_2}	-2.1e-4 (\pm 6.9e-4)	-0.301	0.763
	$P_{CO_2} \times P_{O_2}$	7.1e-7 (\pm 2.4e-7)	2.94	0.004
Larvae	P_{CO_2}	-1.4e-6 (\pm 1.4e-5)	-0.245	0.807
	P_{O_2}	5.9e-4 (\pm 2.3e-3)	0.264	0.792
	$P_{CO_2} \times P_{O_2}$	2.7e-7 (\pm 8.1e-7)	0.336	0.737

Table S4. Bootstrapped means and 95% confidence interval lower (LL) and upper (UL) limits obtained by sampling from Q_{10} values calculated using metabolic rates for every possible pairing of individuals reared in 17°C and 28°C treatments, for *M. menidia* embryos and larvae across three P_{CO_2} treatments.

Stage	P_{CO_2} (μatm)	LL	Mean	UL
Embryo	400	2.33	2.47	2.61
	2200	1.83	1.95	2.07
	4200	1.28	1.36	1.44
Larvae	400	2.51	2.65	2.79
	2200	3.00	3.32	3.67
	4200	3.04	3.26	3.49