Supplementary file

Effect of elevated CO_2 and small boat noise on the kinematics of predator–prey interactions

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CO_2 treatment

CO_2 treatments were maintained by CO_2 dosing to a set $pH_{NBS.}$ Seawater was pumped from the ocean into 60 L header tanks where it was diffused with ambient air (control) or CO_2 to achieve a pH of 7.86. The pH value was selected to achieve the approximate CO_2 conditions required, based on preliminary observations of total alkalinity, salinity and temperature of seawater at Lizard Island. A pH-controller (pH computer, Aqua Medic, Germany) was attached to the CO_2 treatment sump to maintain pH at the desired level. A solenoid injected a slow stream of CO_2 into a powerhead at the bottom of the header tank whenever the pH of the seawater rose above the set point. Equilibrated seawater from each sump was supplied at a rate of 950ml.min^{-1} to ten replicate 35 L aquariums, two housing small groups of *Pomacentrus wardi* and eight housing small groups of *Pseudochromis fuscus* isolated from one another in plastic and mesh containers to minimise stress. Temperature and pH_{NBS} of each aquarium was measured daily using a handheld temperature probe (C26, Comark, Norwich, U.K.) and pH meter (SevenGo Pro pH/Ion, Mettler Toledo) with glass electrode (InLab®413 S8, Mettler Toledo) calibrated with NBS buffers. Seawater CO_2 was confirmed with a portable CO_2 equilibrator and non-dispersive infrared (NDIR) gas analyser (GMP-343, Vaisala, Helsinki, Finland) (for method details see Watson et al. 2017) Total alkalinity of seawater was determined by Gran titration (888 Titrando, Metrohm, Switzerland) from water samples taken from control and treatment tanks. Alkalinity standardizations achieved accuracy within 1% of certified reference material

from Prof. A.G. Dickson (Scripps Institution of Oceanography, U.S., batch number 136). Salinity data were obtained from moorings within the Lizard Island group (Australian Institute of Marine Science). Average seawater pCO_2 was calculated from seawater parameters in the program CO2SYS (Pierrot et al. 2006) using the constants K1, K2 from Mehrbach *et al*. (1973) refit by Dickson and Millero (1987). Seawater parameters are shown in Table S1.

Table S1: Seawater carbonate chemistry parameters for each treatment (mean ± s.e.; values to nearest integer, 1 or 2 d.p.).

Treatment	**Temperature (°C)**	**Salinity**	**pH_{NBS}**	**Total alkalinity (µmol.kg^{-1} SW)**	***p*CO_2 (µatm) from pH_{NBS}**
Ambient CO_2	26.4 (± 0.4)	35.4 (± 0.0)	8.18 (± 0.01)	2230.6 (± 24.3)	384.3 (± 8.5)
Elevated CO_2	26.3 (± 0.4)	35.4 (± 0.0)	7.86 (± 0.00)	2221.6 (± 21.1)	925.0 (± 3.7)

References used in Supplementary file

Dickson AG, Millero FJ. 1987 A comparison of the equilibrium constants for the dissociation of carbonic acid in seawater media. *Deep-Sea Res*. **34**, 1733-1743.

Mehrbach C, Culberson CH, Hawley JE, Pytkowicz RM. 1973 Measurement of the apparent dissociation constants of carbonic acid in seawater at atmospheric pressure. *Limnol. Oceanogr*. **18**, 897–907.

Pierrot D, Lewis E, Wallace DWR. 2006 MS Excel program developed for CO_2 system calculations. Oak Ridge, Tennessee, U.S.A., ORNL/CDIAC-105a. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy.

Watson SA, Fabricius KE, Munday PL. 2017 Quantifying pCO_2 in biological ocean acidification experiments: A comparison of four methods. *PloS ONE* **12**, 16. (doi:10.1371/journal.pone.0185469).

Table S2. Comparison of the effects of CO_2 pre-treatment (400, 950 µatm) and sound regime (ambient reef, boat) on the kinematics of the interaction between juvenile damselfish prey (*Pomacentrus wardi*) and dottyback predator (*Pseudochromis fuscus*). Only those variable with significant effects are shown. Given (in order) are F, p ($p < 0.05$ in bold) and partial eta-squared (i.e., effect size). Tests were undertaken with 1 and 68df.

Variable	CO_2	Sound	Sound x CO_2
Predator attack distance	4.37, **0.040**, 0.06	1.90, 0.173, 0.03	1.29, 0.259, 0.02
Predator attack speed	5.93, **0.017**, 0.08	1.60, 0.209, 0.02	3.85, 0.054, 0.05
ALT	4.39, **0.040**, 0.06	0.58, 0.450, 0.01	0.42, 0.518, 0.01

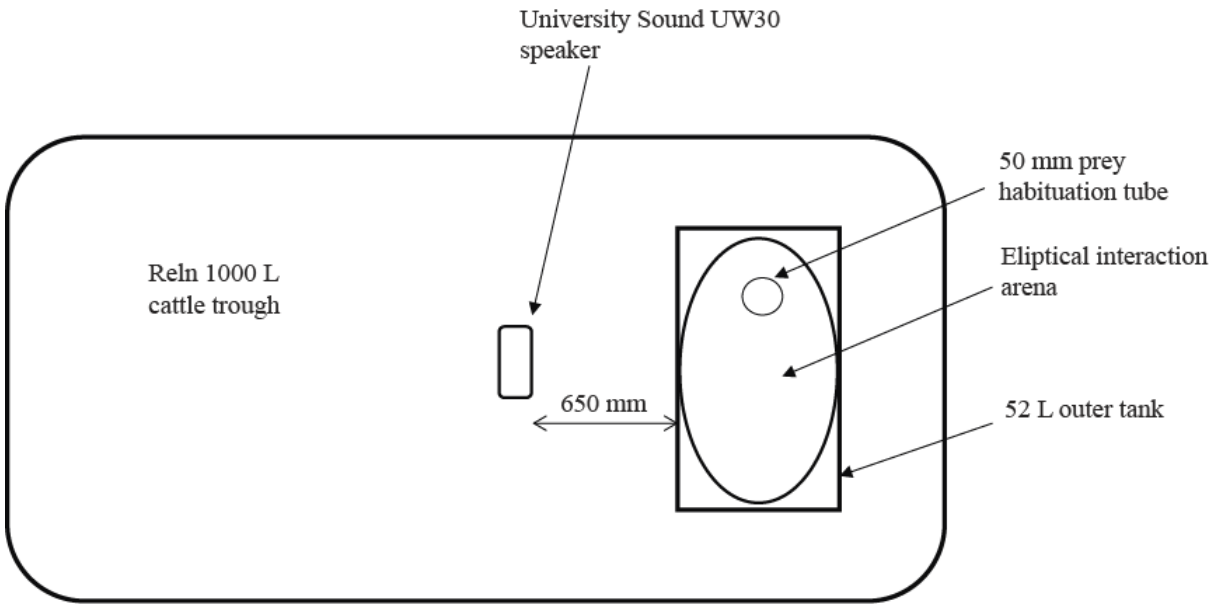

Figure S1. Experimental setup of the noise mesocosm and predator–prey arena.