Supplementary Material

Elevated temperature does not substantially modify the interactive effects between elevated CO2 and diel CO2 cycles on the survival, growth and behaviour of a coral reef fish

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**Supplementary Figure 1.** Mean daily *p*CO2 profiles at 29 and 31°C.



**Supplementary Figure 2.** Schematic diagram of one individual system. The experimental setup was comprised of 16 systems.

**Supplementary Table 1.** Comparison between the present study and two previous studies (Jarrold et al., 2017; Jarrold and Munday, 2018) of the effects that stable elevated, diel-cycling elevated CO2 and elevated temperature had on the survival, growth and behaviour of the spiny damselfish, *Acanthochromis polyacanthus*. *NA* is used to show that a trait was not measured in a study. – represents no significant effects or apparent response. Arrows represent the direction of a response, while the colours represent the following: Red = significant negative effect; Green = significant positive effect and orange represents a non-significant trend. The responses of traits to stable-elevated CO2 are relative to the control treatment, while the responses to diel-cycling elevated CO2 are relative to stable elevated CO2.

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| --- | --- | --- | --- |
|   | Jarrold et al., 2017 | Jarrold and Munday 2018 | Present study |
| Trait | Stable-elevated CO2 | Diel cycling-elevated CO2  | Stable-elevated CO2 | Diel cycling-elevated CO2  | Stable-elevated CO2 | Diel cycling-elevated CO2  | Elevated temperature |
| Survival  | *NA* | *NA* | − | − | − | − | ↓ |
| Growth | *NA* | *NA* | ↓ | ↑ | ↓ | ↑ | ↓ |
| Absolute lateralization  | ↓ | ↑ | *NA* | *NA* | ↓ | ↑ | − |
| Relative lateralization  | − | − | *NA* | *NA* | − | − | − |
| Routine activity | *NA* | *NA* | *NA* | *NA* | − | ↓ | ↓ |
| Boldness | *NA* | *NA* | *NA* | *NA* | − | − | ↓ |
| Fast starts | *NA* | *NA* | *NA* | *NA* | − | − | ↑ |

References

Jarrold, M. D., Humphrey, C., McCormick, M. I., and Munday, P. L. (2017). Diel CO2 cycles reduce severity of behavioural abnormalities in coral reef fish under ocean acidification. *Sci. Rep.* 7, 10153. doi:10.1038/s41598-017-10378-y.

Jarrold, M. D., and Munday, P. L. (2018). Diel CO2 cycles do not modify juvenile growth, survival and otolith development in two coral reef fish under ocean acidification. *Mar. Biol.* 165. doi:10.1007/s00227-018-3311-5.