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**Detrital photosynthesis has a colder thermal optimum**

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**Abstract**

* **Background and aims**.
* **Methods**.
* **Key results**.
* **Conclusions**.

**Key words**

**Introduction**

General kelp photosynthesis and detrital photosynthesis

{Pessarrodona et al., 2022, #59697}

{Filbee-Dexter et al., 2022, #89941}

{Pedersen et al., 2021, #86829}

{Wright and Foggo, 2021, #58009} Wright and Kregting in press

{Frontier et al., 2021, #81381}

Coined by {Frontier et al., 2021, #5570} and elaborated on by {Wright et al., 2022, #84775}

{de Bettignies et al., 2020, #27484}

{Fraser et al., 2018, #16089}{Tala et al., 2019, #47562}

{Rothäusler et al., 2018, #79733}

{Hees et al., 2019, #74884}

Thermal optimum of Ecklonia radiata photosynthesis as a model species

{Blain et al., 2020, #104416}

{Fairhead and Cheshire, 2004, #59940}

{Wernberg et al., 2016, #79636}{Staehr and Wernberg, 2009, #54759}

{Miller et al., 2006, #57478}

{Fairhead and Cheshire, 2004, #9508}

{Desmond et al., 2019, #89579}

{Rodgers et al., 2015, #29788}

Thermal optimum of Ecklonia radiata detrital photosynthesis

**Materials and methods**

***Decomposition experiment***

***Photosynthesis measurement***

Initially, respiration was measured following photosynthesis to account for potential elevation of respiration during light incubation {Miller III and Dunton, 2007, #23985}, although there is evidence that this doesn’t matter. However, we soon noticed that oxygen production was maintained in the dark following excitation under saturating photon flux density and only after a period of over ~10 min in the dark was respiration evident. Conversely, photosynthesis kicked in after the dark period as soon as the sample was irradiated. To streamline the experiment, most respiration measurements were therefore conducted before the photosynthesis measurements. This substantially reduced the required waiting time between measurements and seemingly did not affect respiration rates (see data).

If measurements series were longer than ~5 min, they were truncated by removing data either at the start or end of the series. The decision on whether to truncate the start or end was based on minimisation of measurement error and maximisation of slope similarity compared to the untruncated series. If both optima conflicted, maximisation of slope similarity was prioritised in the trade-off.

***Data analysis and visualisation***

**Results**

**Discussion**

Comparison with published thermal optimum

{Wernberg et al., 2016, #79636}{Staehr and Wernberg, 2009, #54759}

Comparison with published photosynthesis rates

Potential drivers of shift in thermal optimum

Conclusion

**Acknowledgements**

**Literature cited**

**Figure captions**