

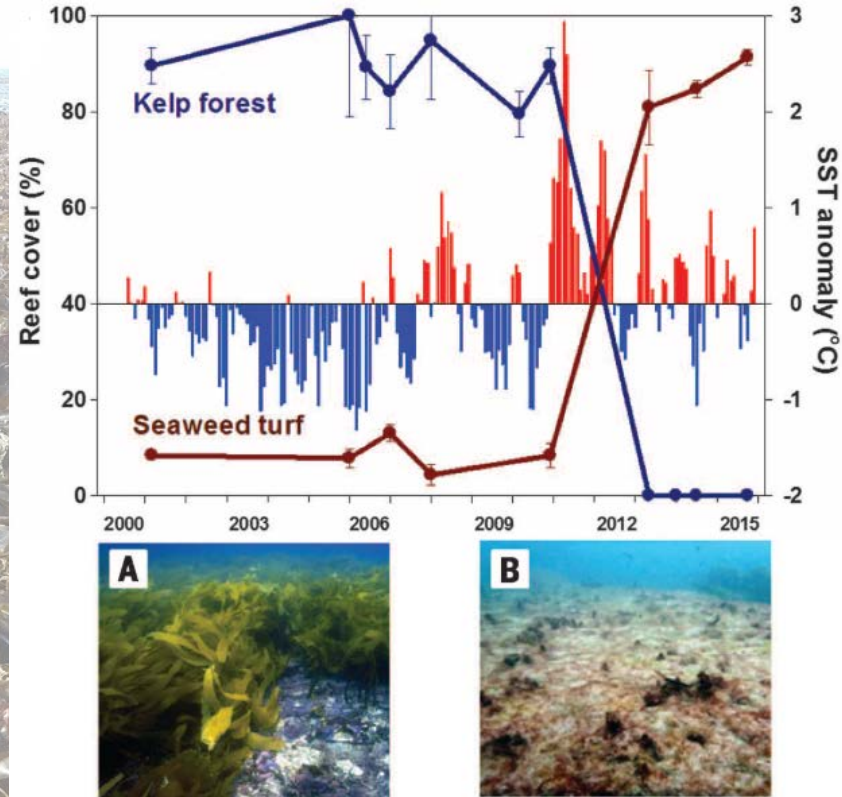
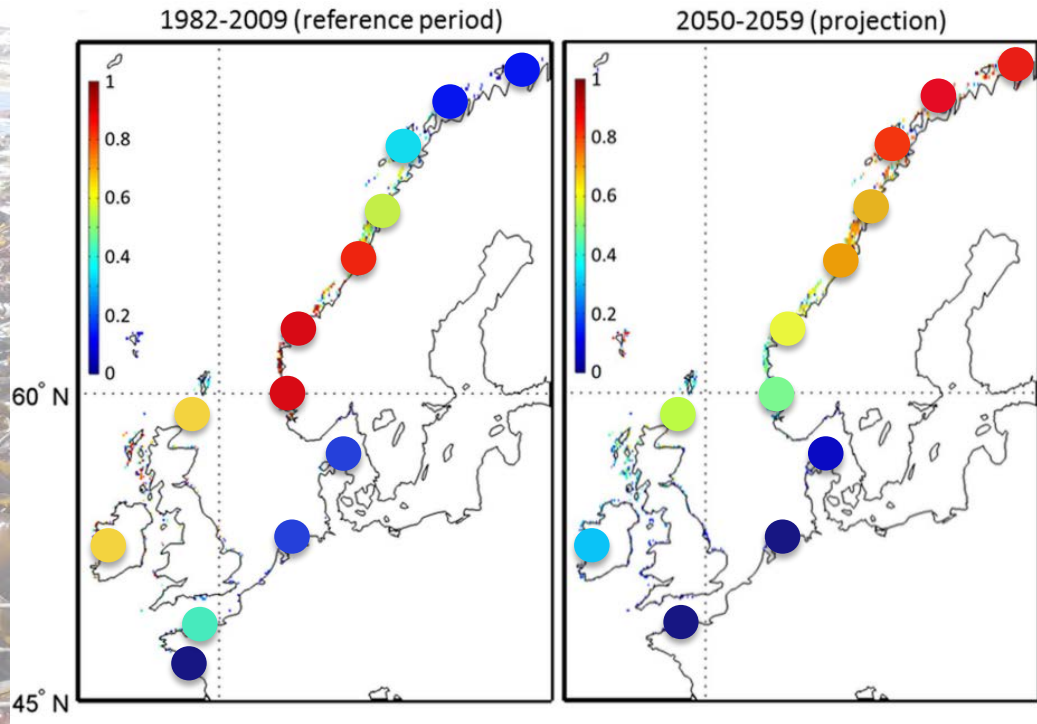
Transgenerational temperature effects in the kelp *Laminaria digitata*



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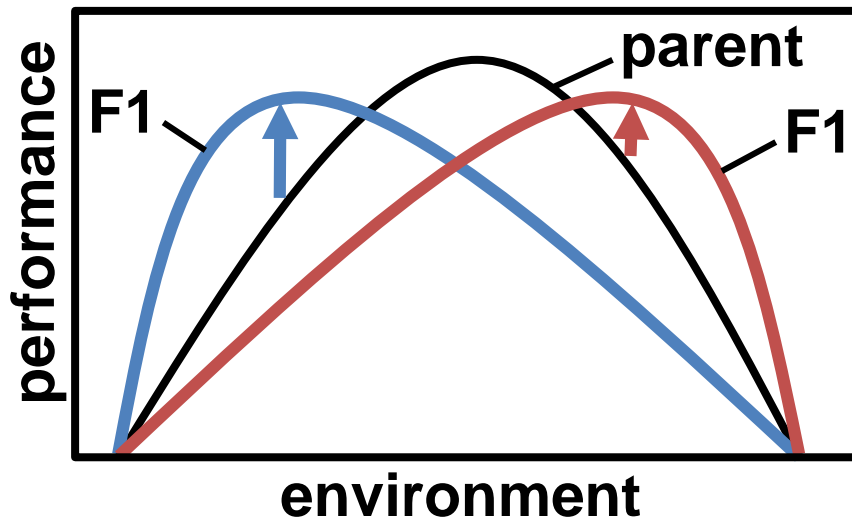
Daniel Liesner, Lisa N.S. Shama, Nora Diehl, Klaus Valentin, Inka Bartsch





Gradual warming and heatwaves threaten temperate kelp populations.

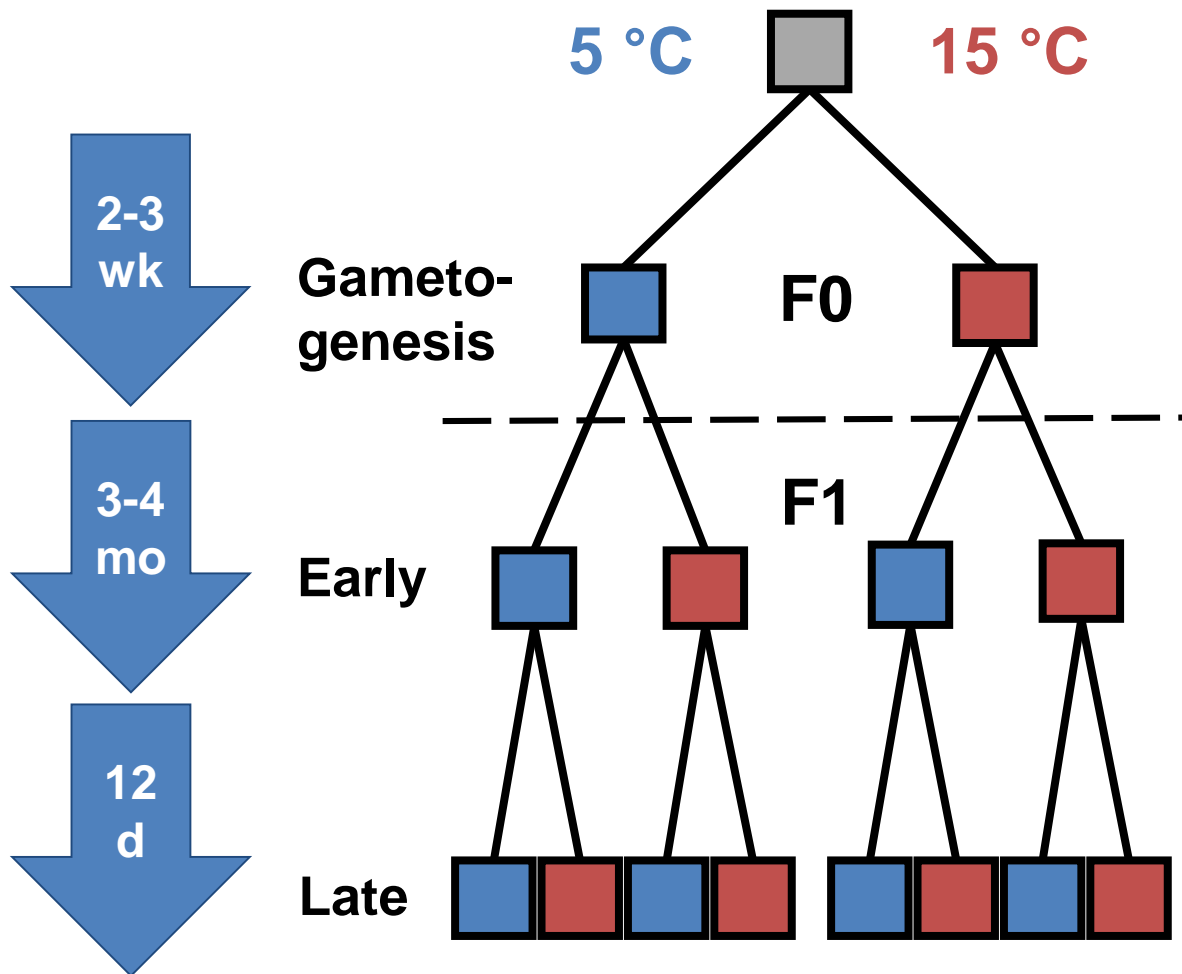
Transgenerational plasticity



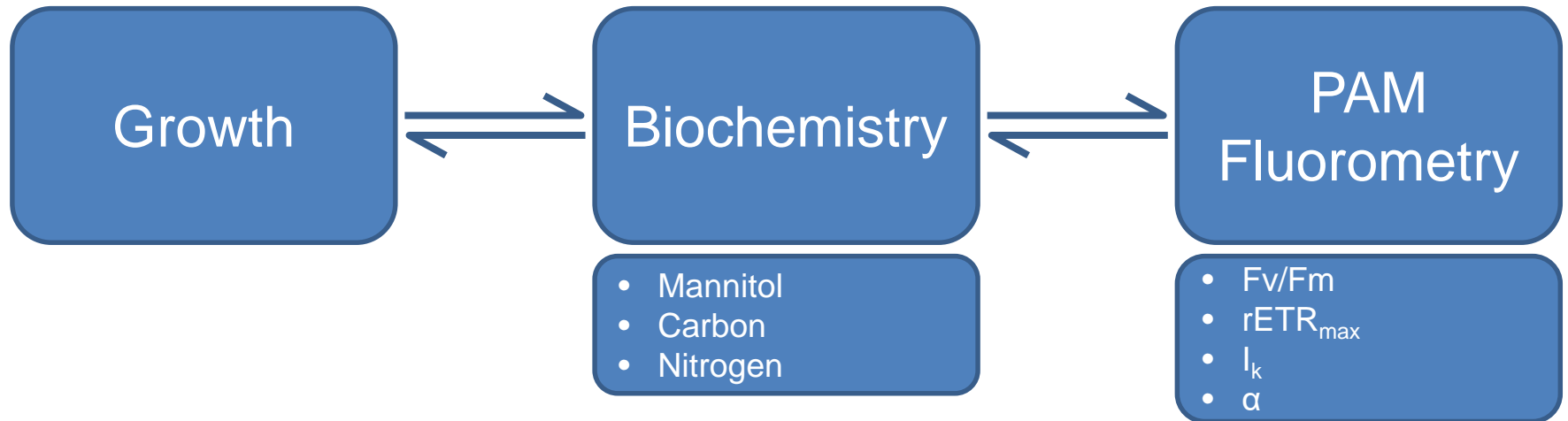
TGP: interactive effects of parental and offspring environment on offspring phenotype

Does adaptive TGP prime help offspring for higher temperatures across life cycle stages?

Experimental design



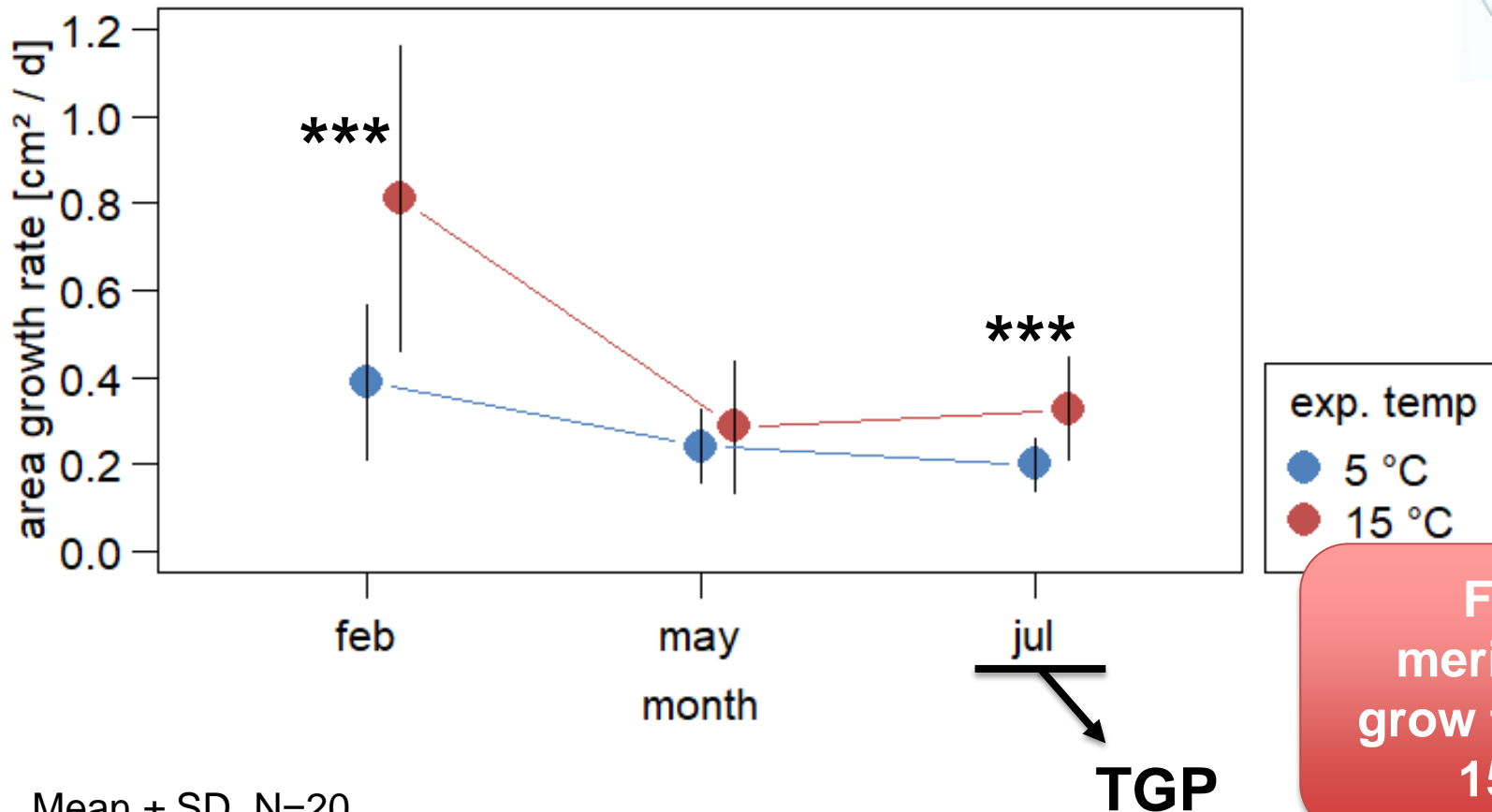
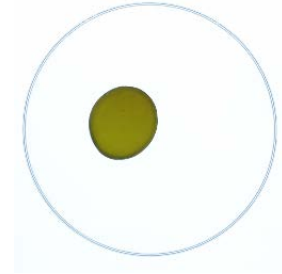
Experimental design



Hypothesis:
Adaptive TGP for parental gametogenesis temperature.



Field material: Reaction norm

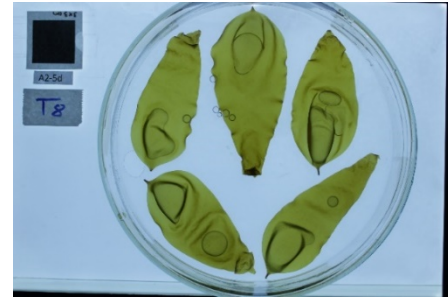
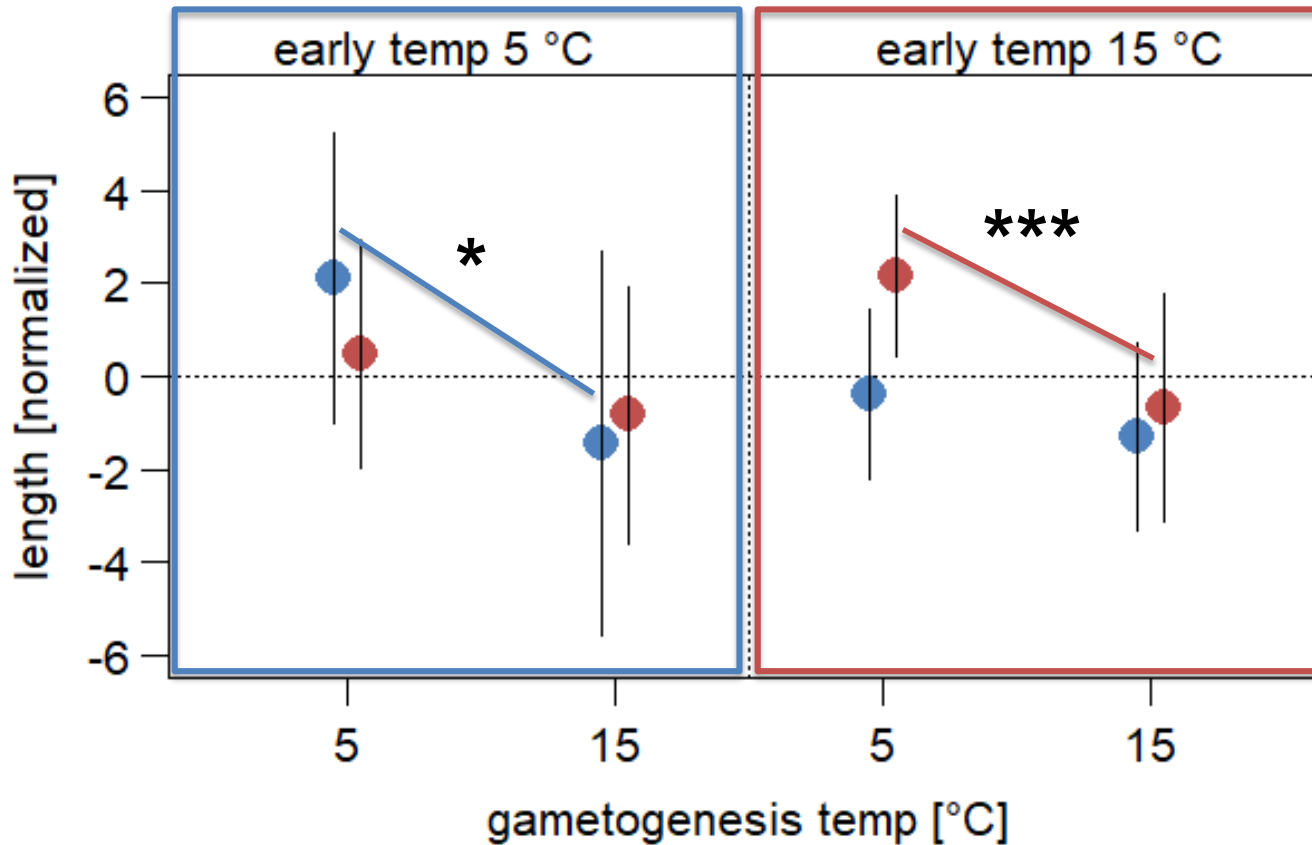


Mean ± SD, N=20

TGP

Field meristems grow faster at 15 °C

TGP: Growth

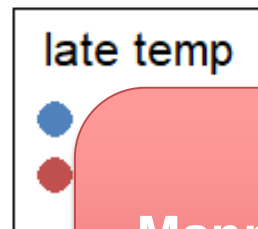
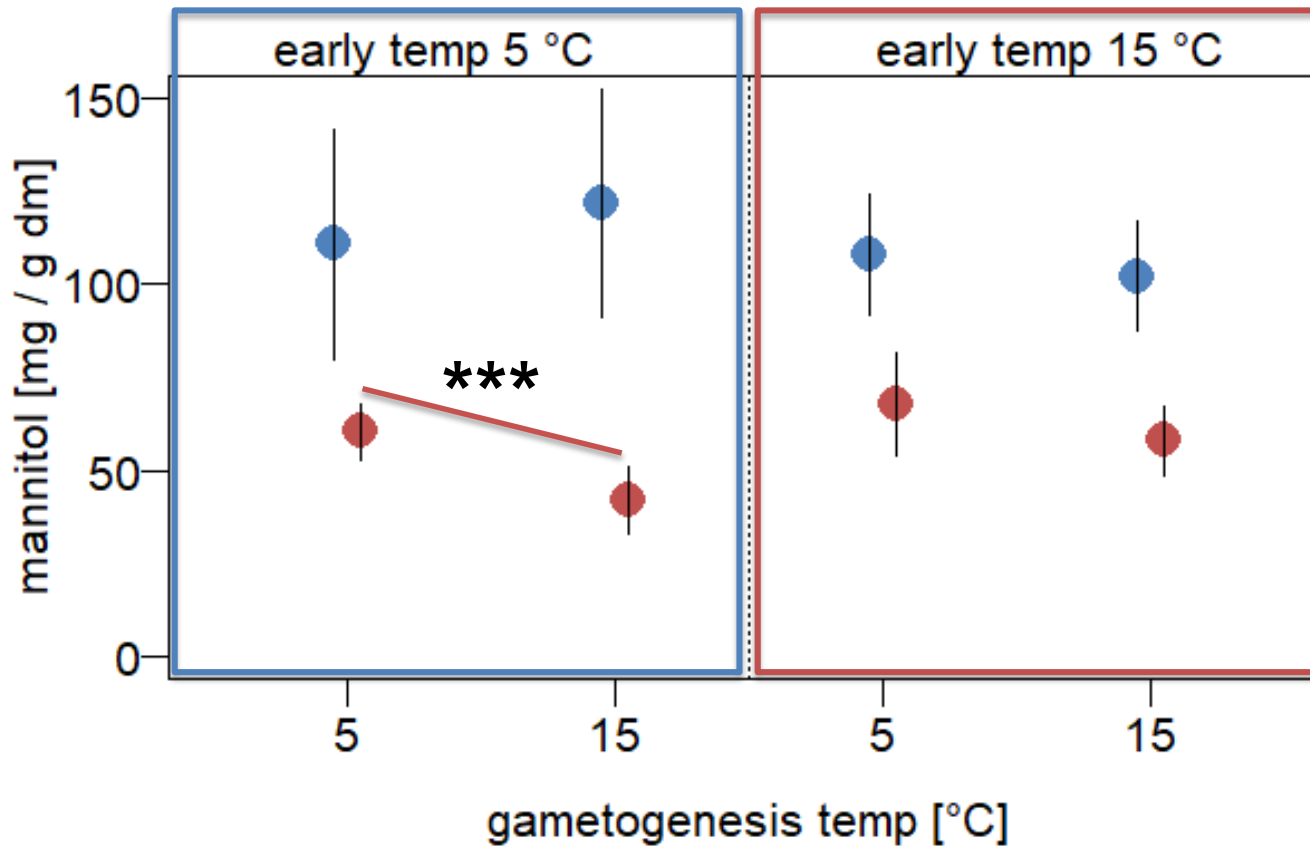


late temp

TGP:
Beneficial
effect of 5 °C
gametogenesis
on growth.

Mean ± SD, N=4 for 5 strains

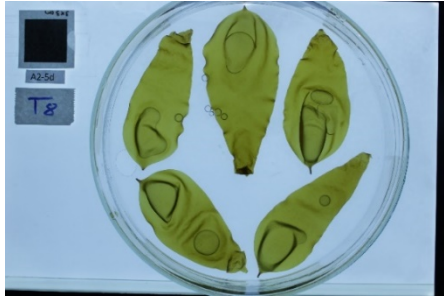
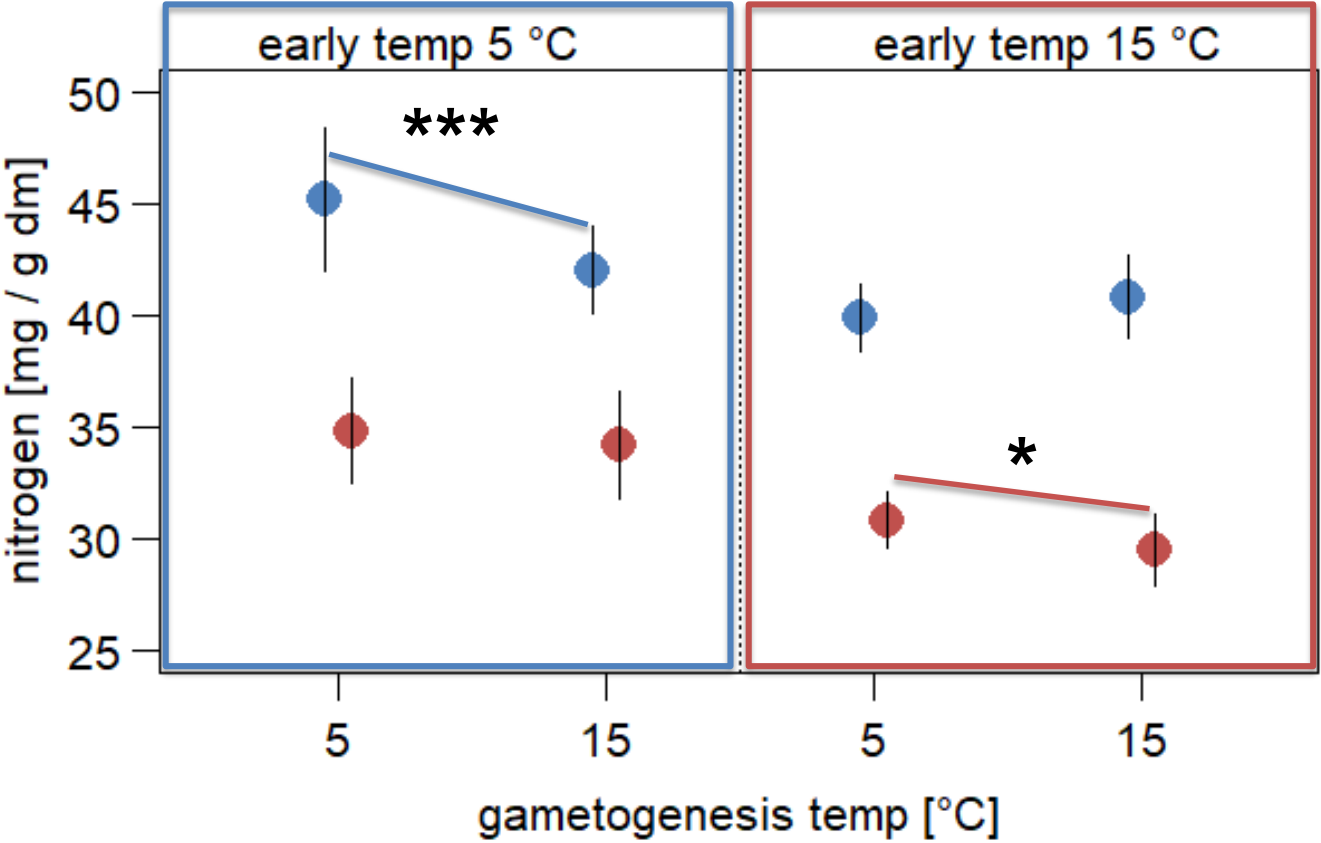
TGP: Mannitol



Mannitol ~2x higher in L 5 °C.

Mean \pm SD, N=4 for 5 strains

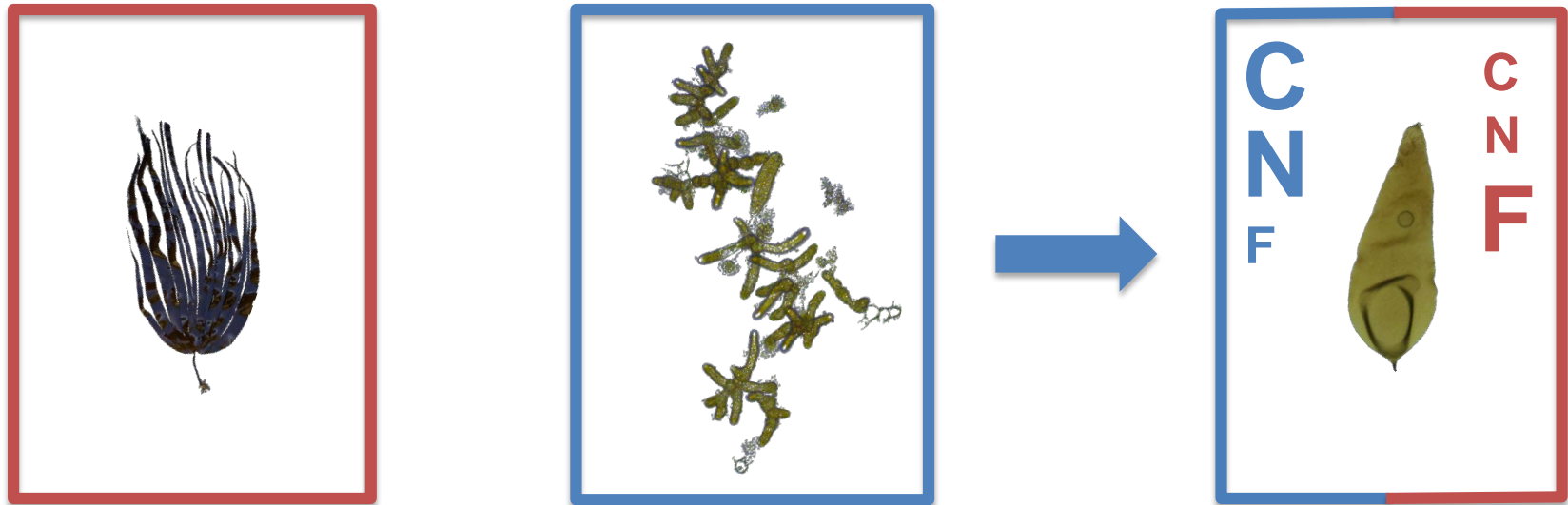
TGP: Nitrogen



late temp
● blue
● red

Nitrogen higher in L 5 °C.
TGP ~ growth

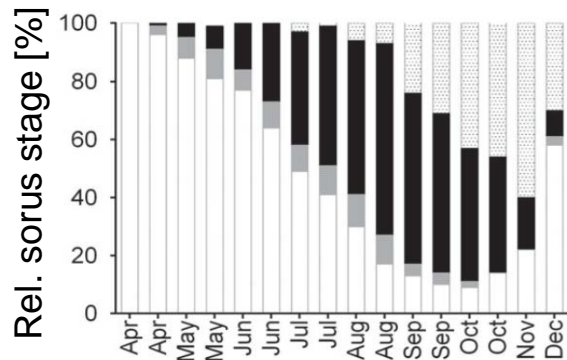
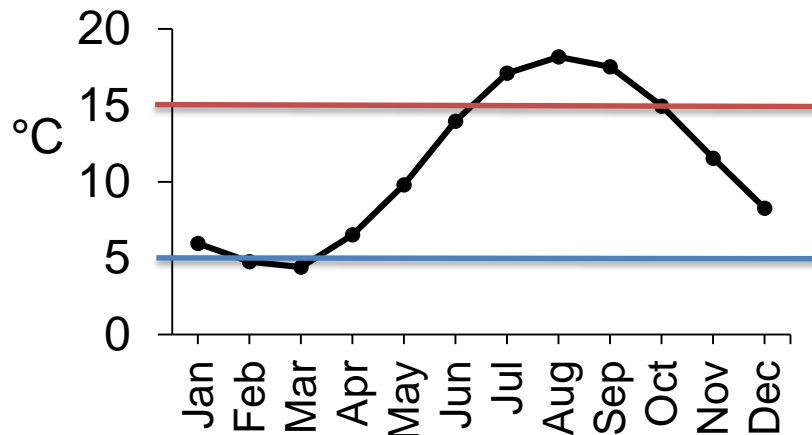
Mean ± SD, N=4 for 5 strains



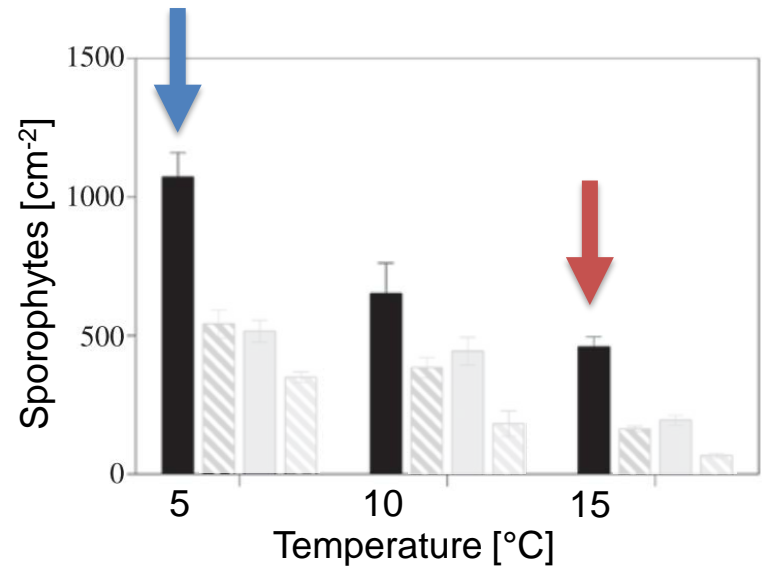
**TGP: Beneficial growth effects following cold parental treatment.
No adaptive TGP regarding warm temperature.**

Outlook

Helgoland mean SST 2017-18



- C0: no sorus
- C1: sorus immature
- C2: sorus mature
- ▨ C3: sorus ageing



Importance of cold refuge during winter!

Bartsch *et al.* (2013). Prevailing sea surface temperatures inhibit summer reproduction of the ... J. Phycol.

Martins *et al.* (2017). Interactions of daylength, temperature and nutrients affect thresholds ... Bot. Mar.

Wiltshire *et al.* (2008). Resilience of North Sea phytoplankton spring bloom dynamics. PANGAEA 2004

Thank you!

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Further work:

1. Ecotypic differentiation along the European latitudinal gradient
2. Parent-specific inheritance patterns



@lies_nerd

