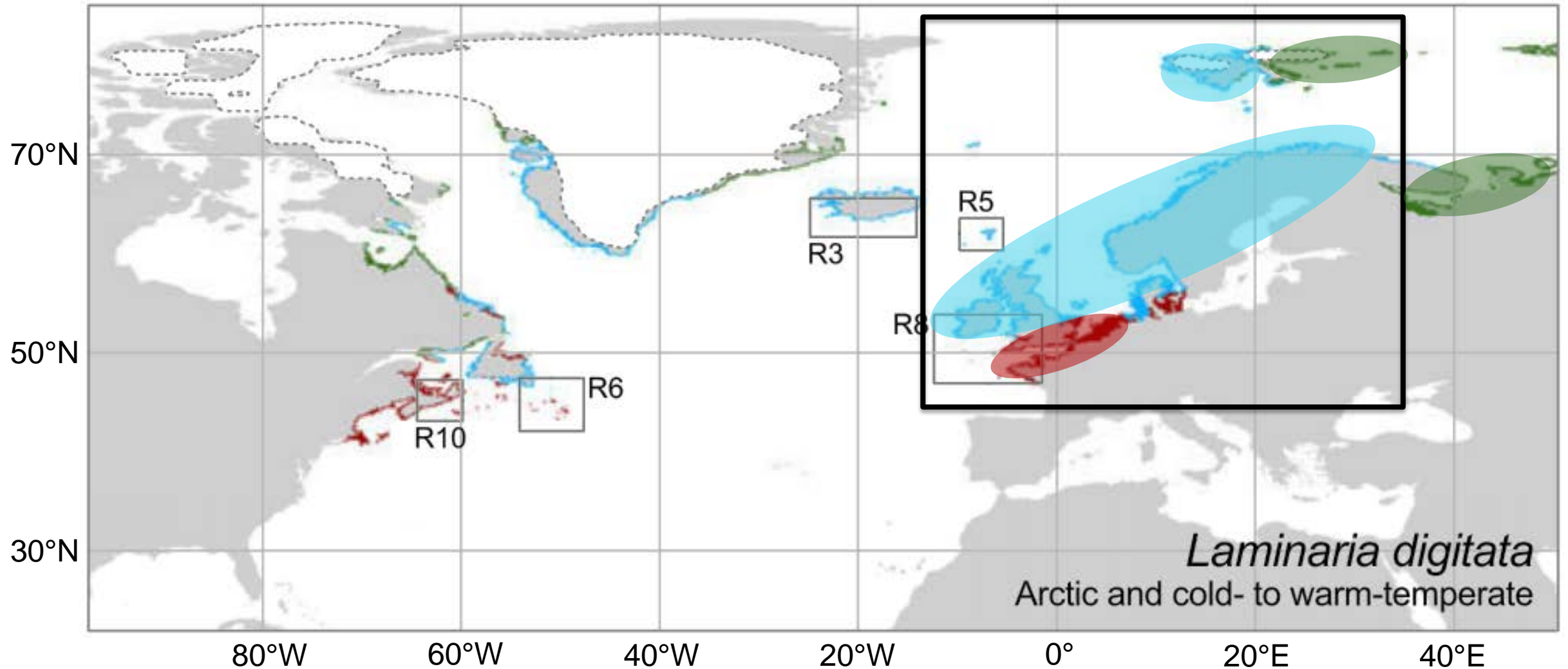


Local differentiation in heat response of *Laminaria digitata* at the range edges

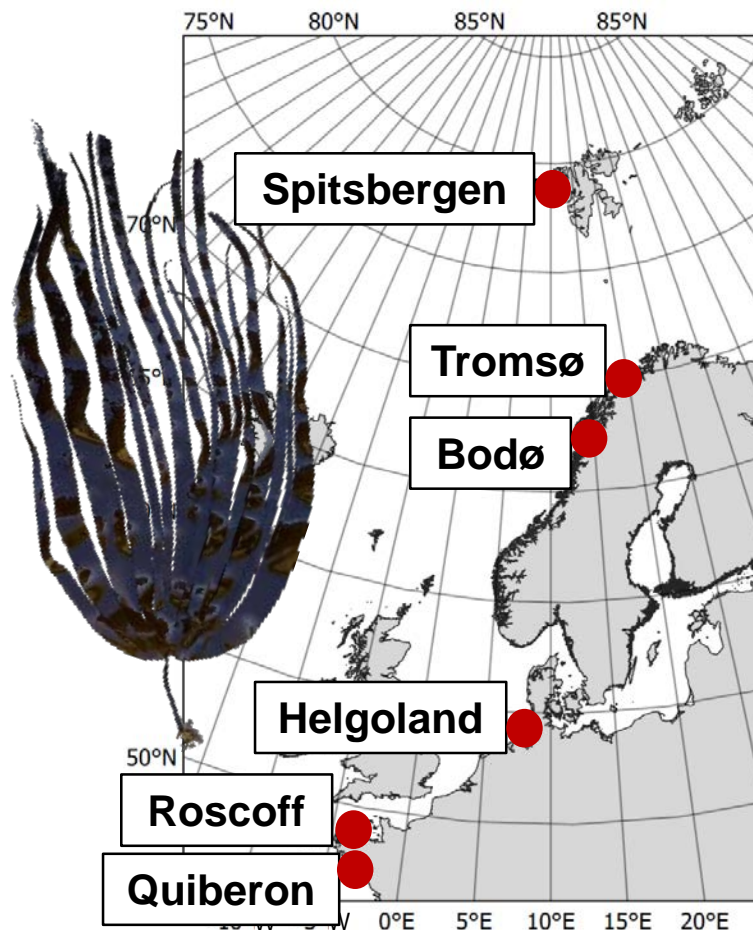
Daniel Liesner, L. Fouqueau, M. Valero, M. Roleda,
G. Pearson, K. Bischof, K. Valentin, I. Bartsch



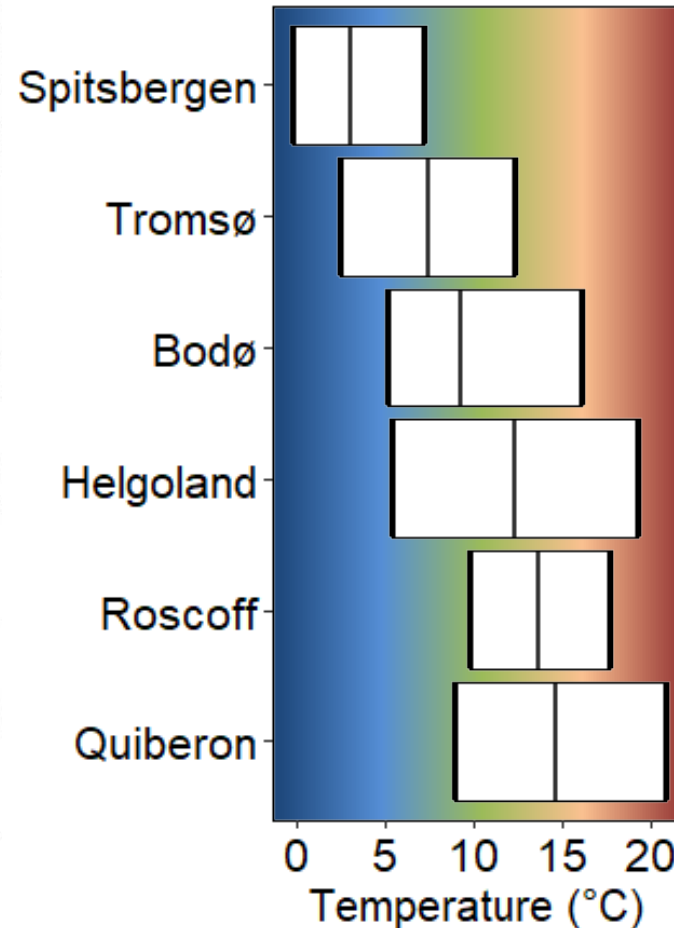
Range shifts



Local adaptation for heat tolerance?



Min | mean | max daily SST 2018



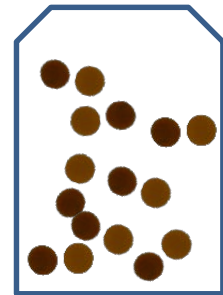
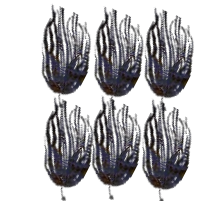
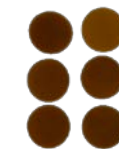
Do populations of *Laminaria digitata* differ in short-term heat tolerance?

Do population genetic characteristics relate to physiological responses?

Experimental design

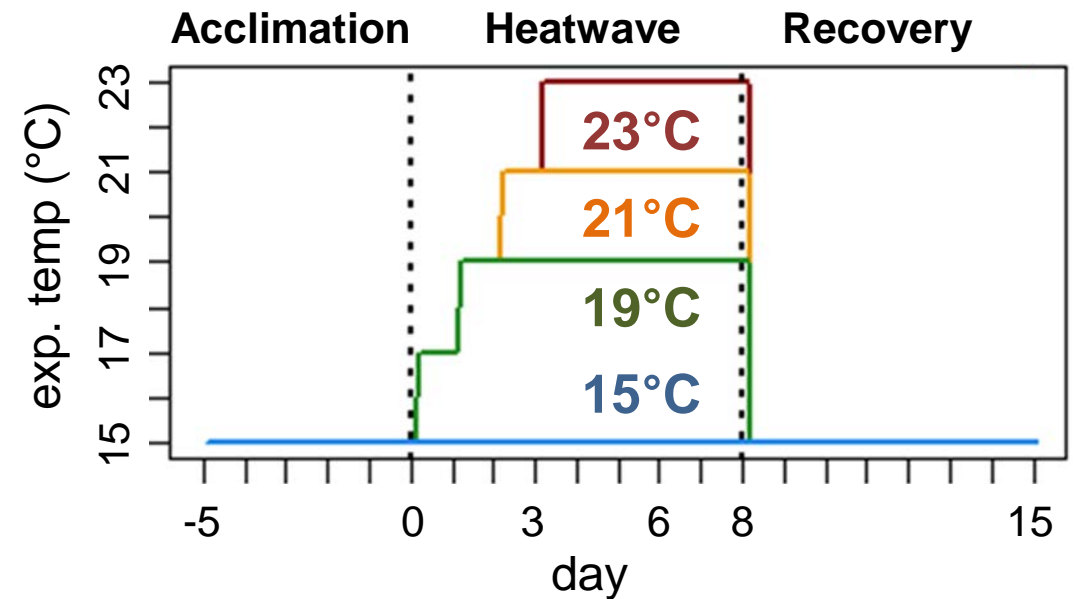


n = 30



n = 5

⇒ TAGTAGTAGTAGTAGTAGTAGTAGTAGTAG ⇒
⇒ ACACACACACACACACACACACAC ⇒
⇒ AACACAACAACAACAACAAC ⇒
⇒ TCTCTCTCTCTCTCTCTC ⇒ **n = 12**



Genetic structure and diversity

Growth

- Fresh weight



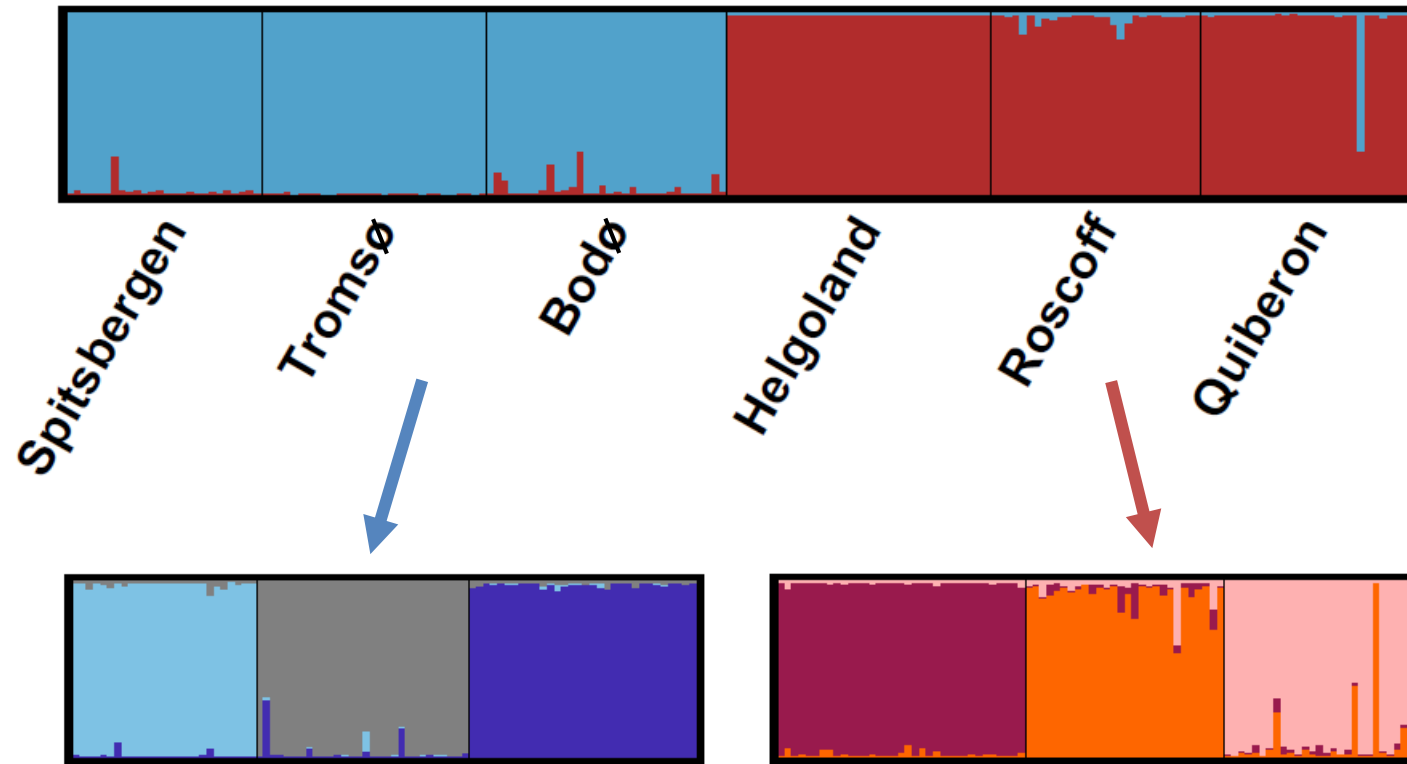
PAM
Fluorometry

- F_v/F_m

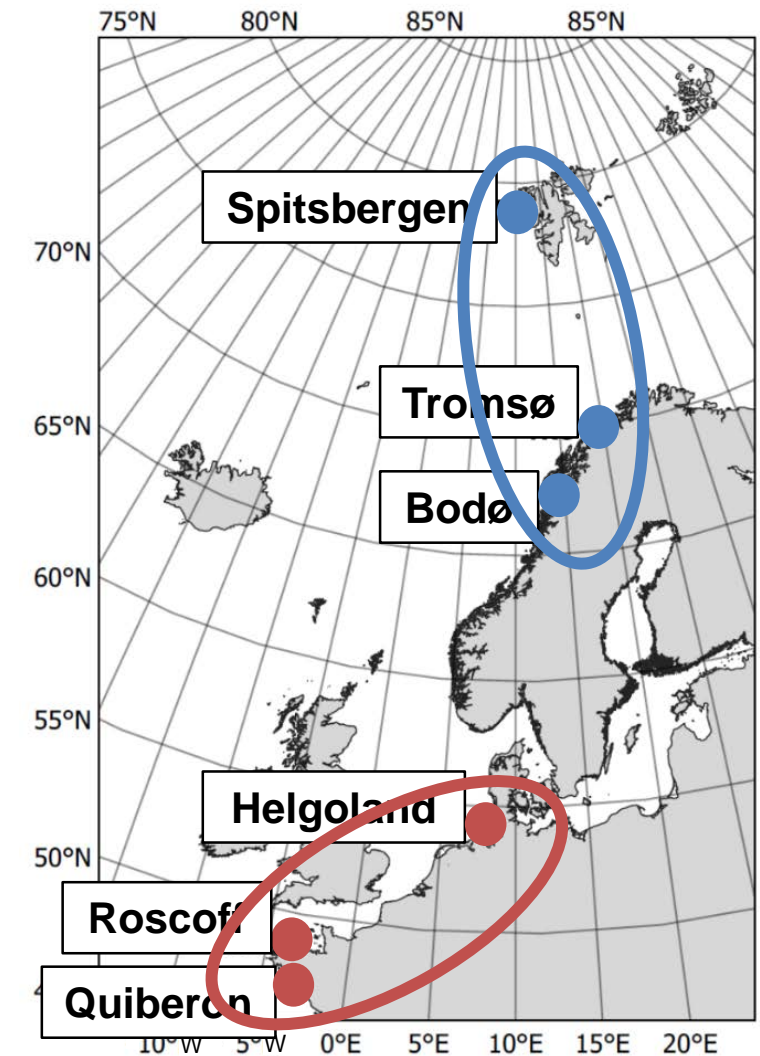
Hypotheses:

1. Heat resilience decreases with higher latitudes.
2. ... and with lower genetic diversity.

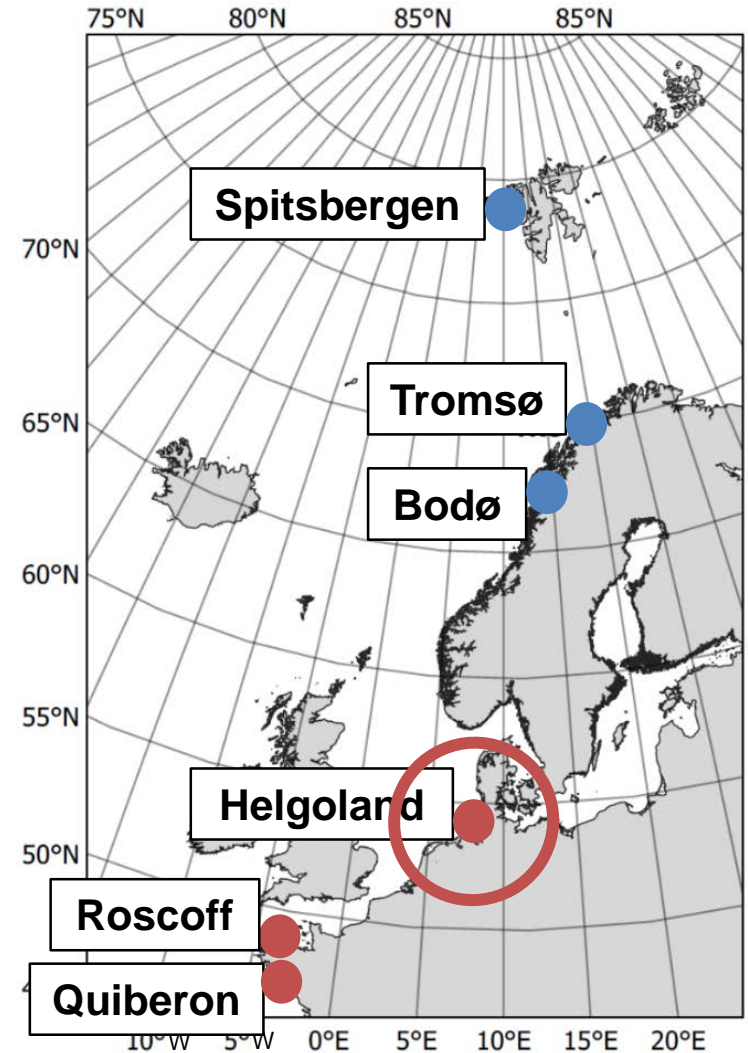
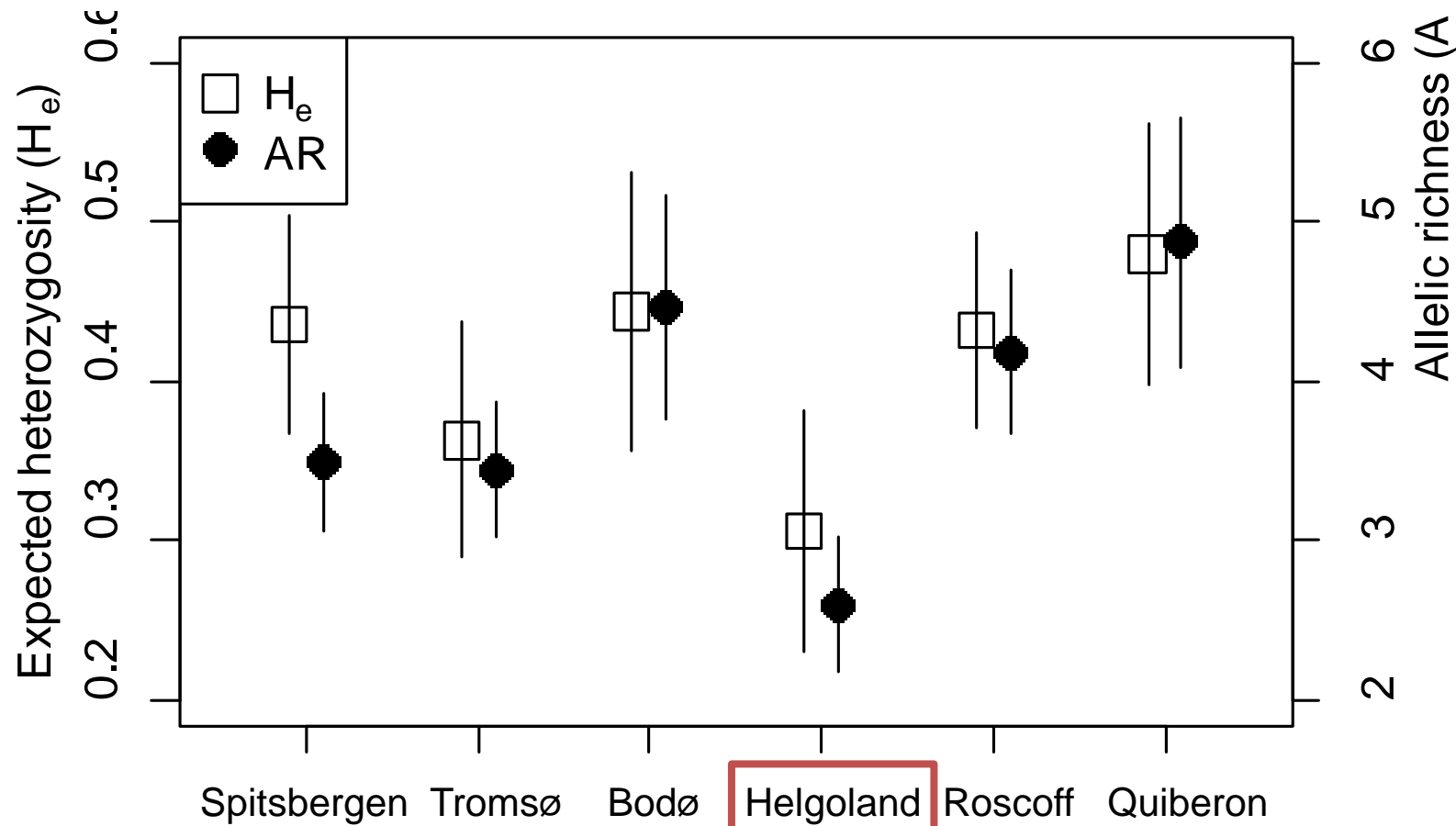
Population genetics: structure



**Strong structuring
between and within
northern and southern clades**

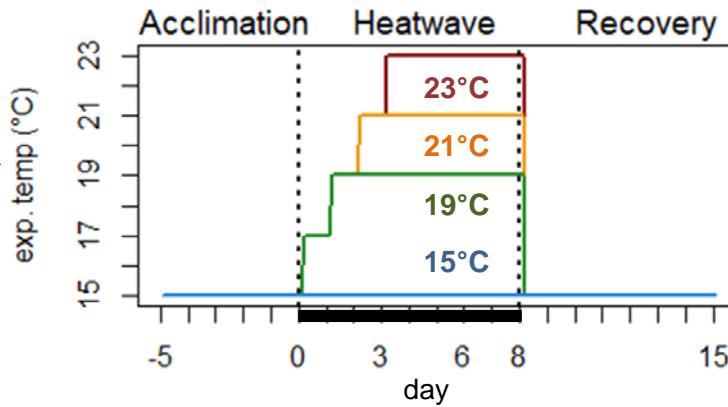


Population genetics: diversity

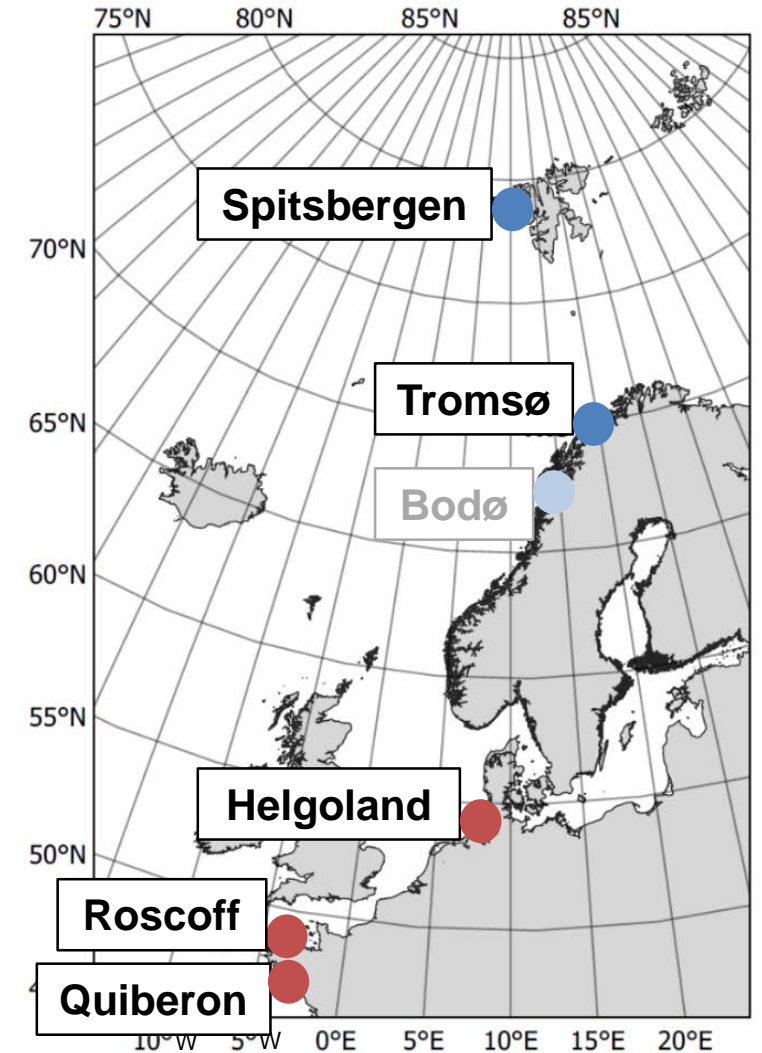
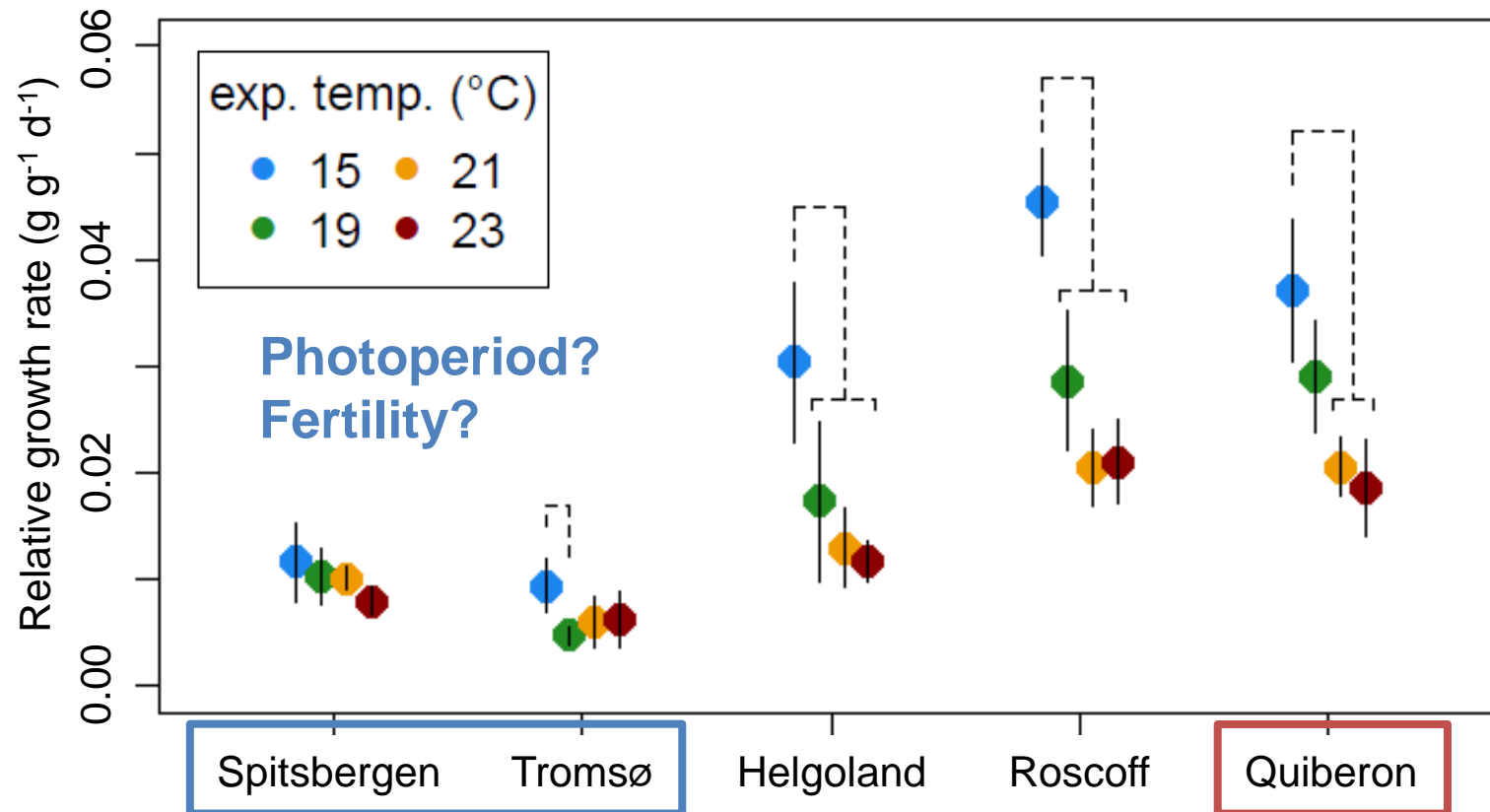


Helgoland is genetically isolated.

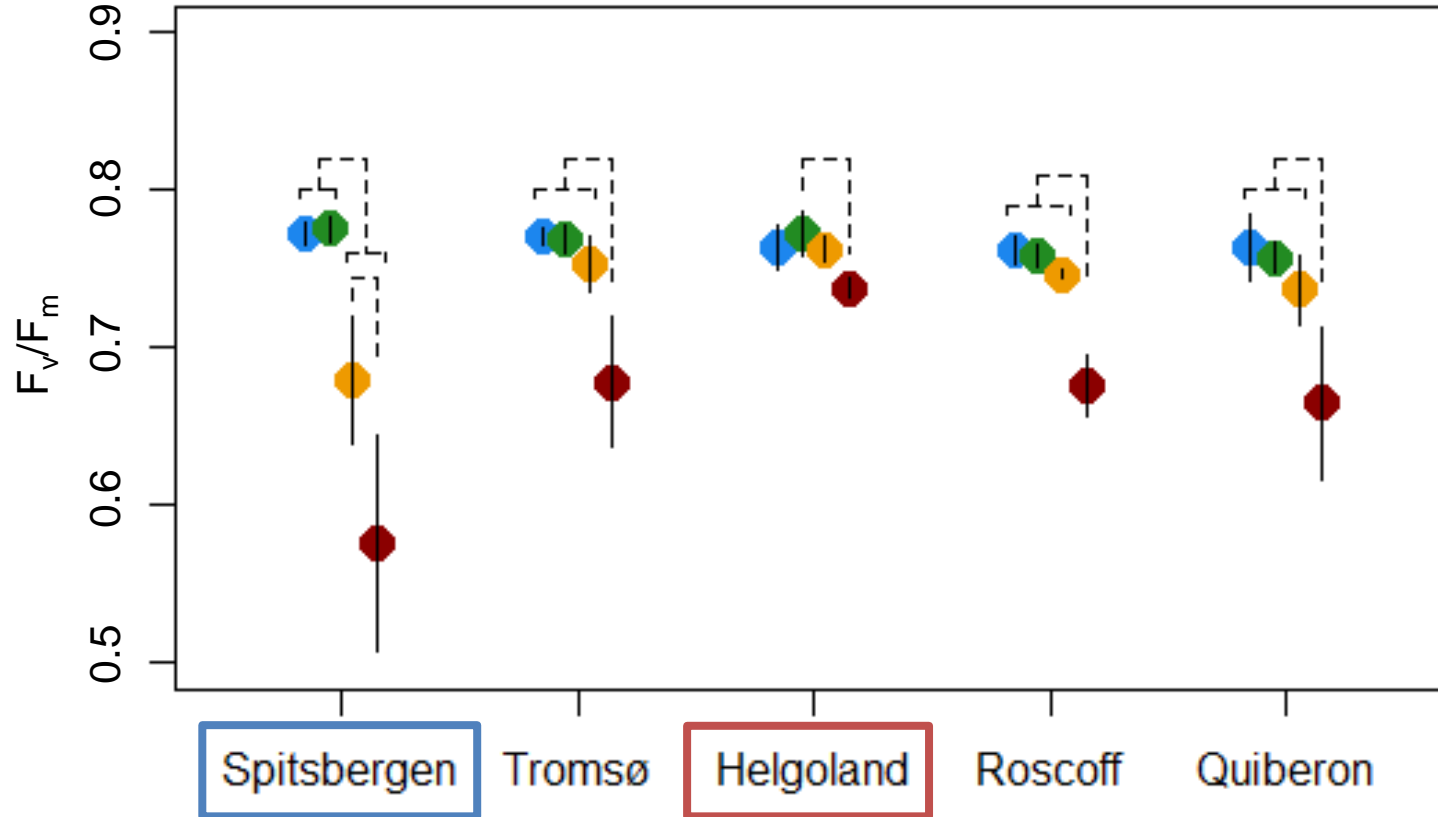
Physiology: growth



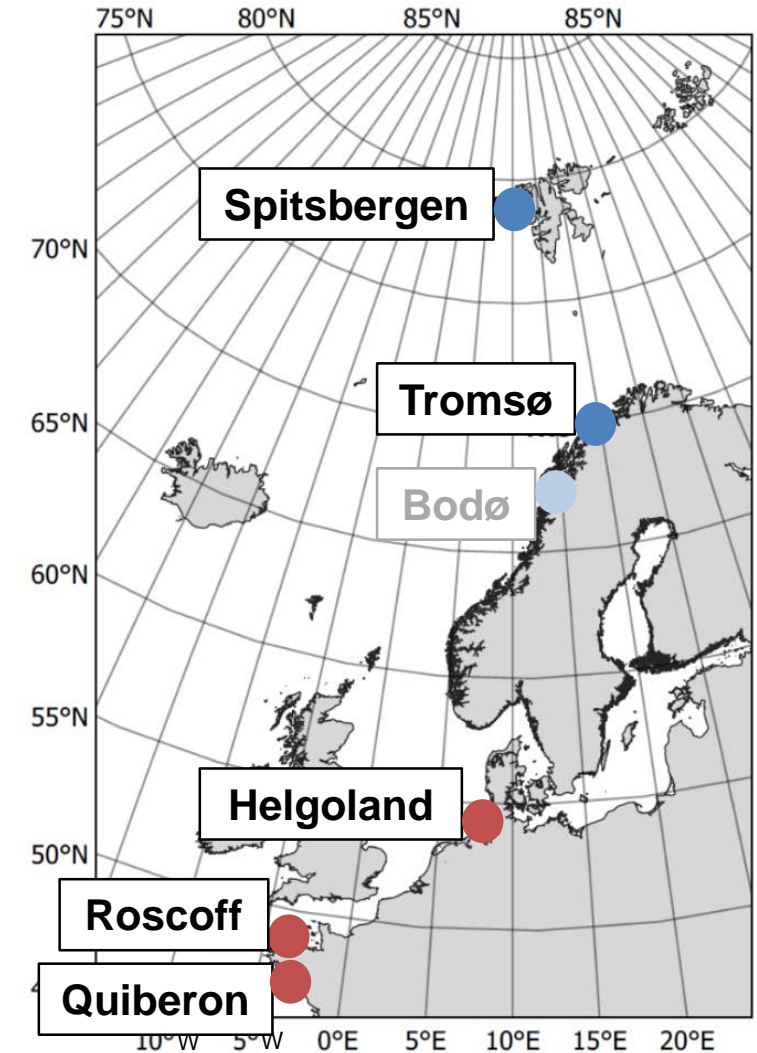
Slight advantage for Quiberon?



Physiology: optimum quantum yield

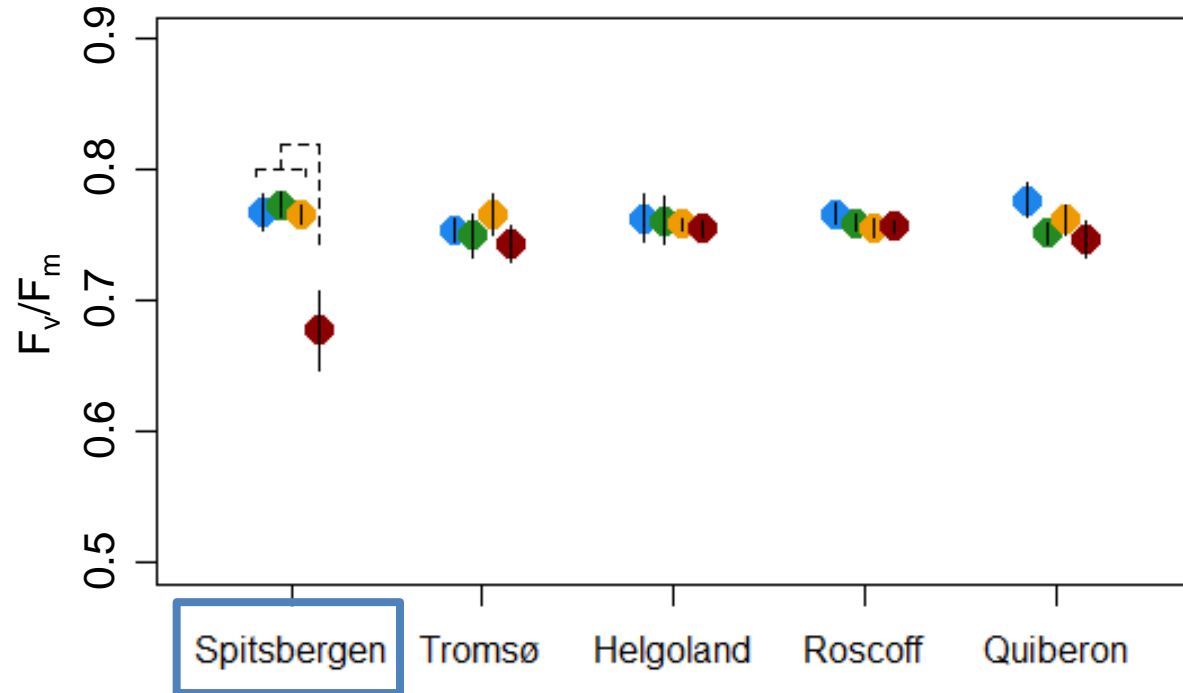


No stress response in Helgoland?

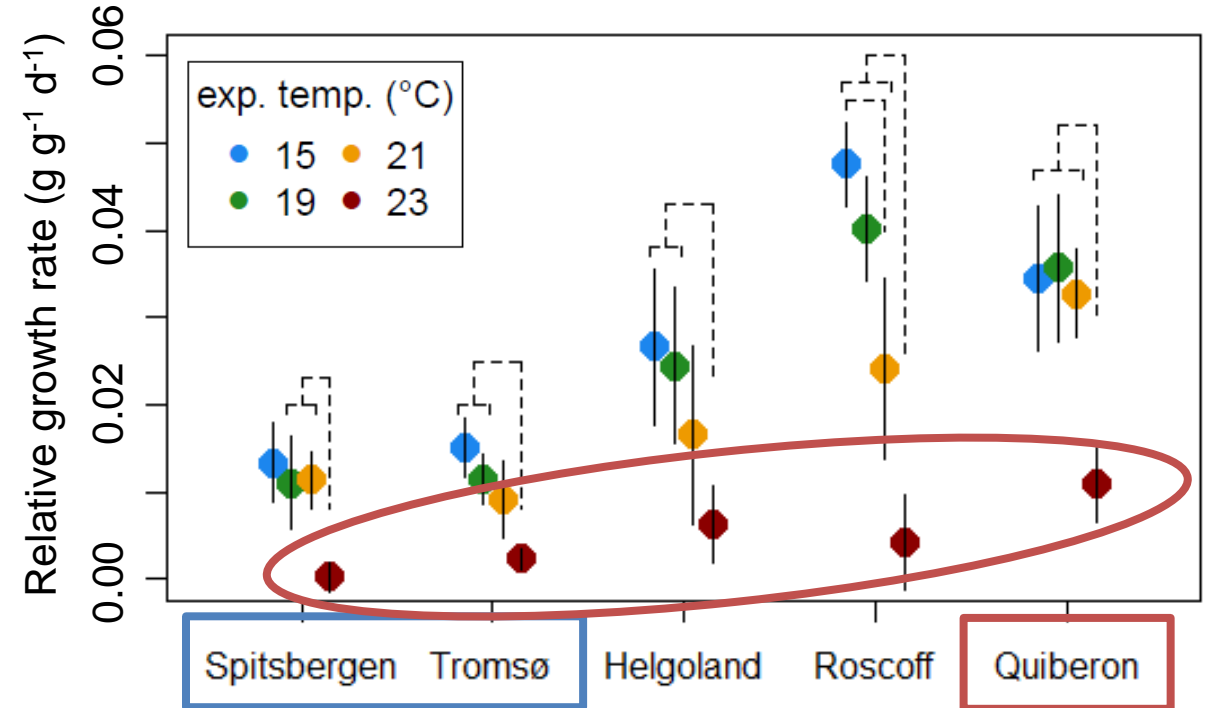


Physiology: recovery

Optimum quantum yield

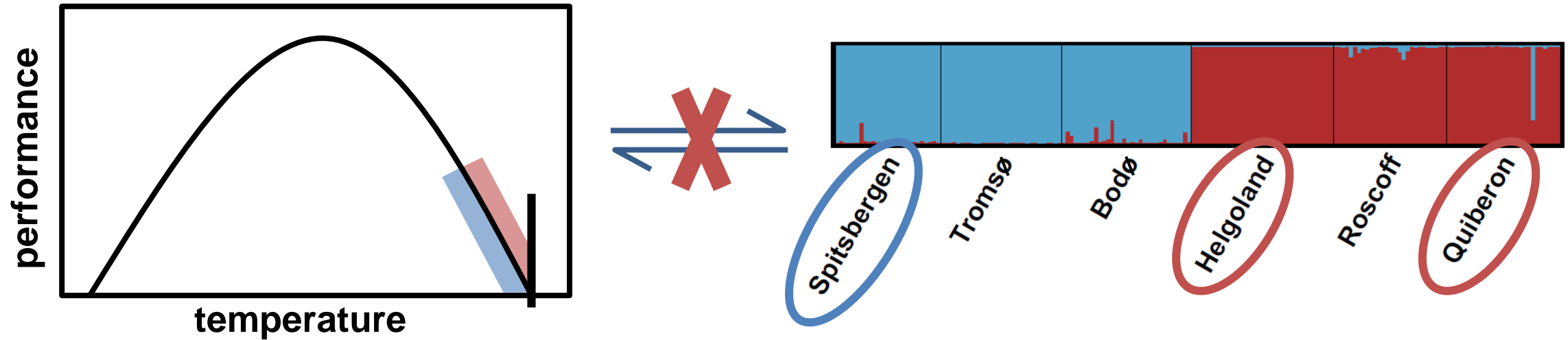


Growth



5 days at 23°C harmful for all populations.

Synthesis



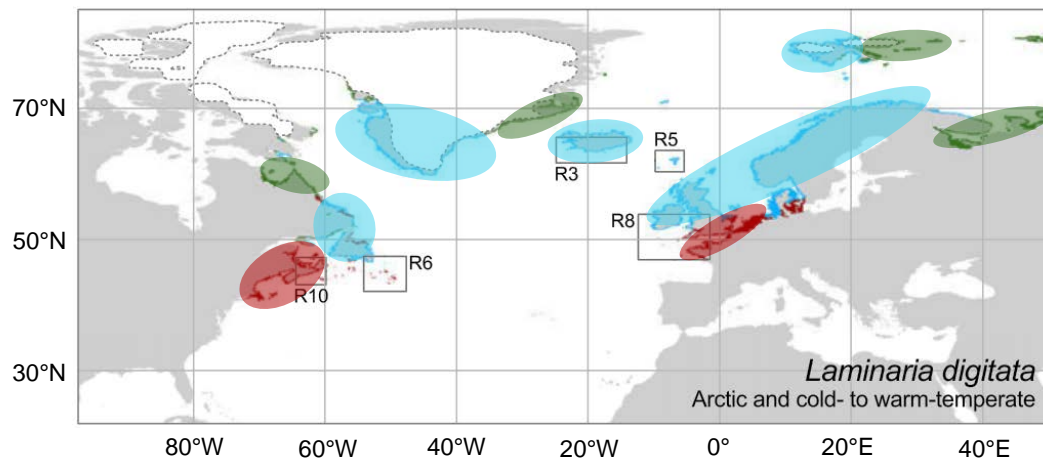
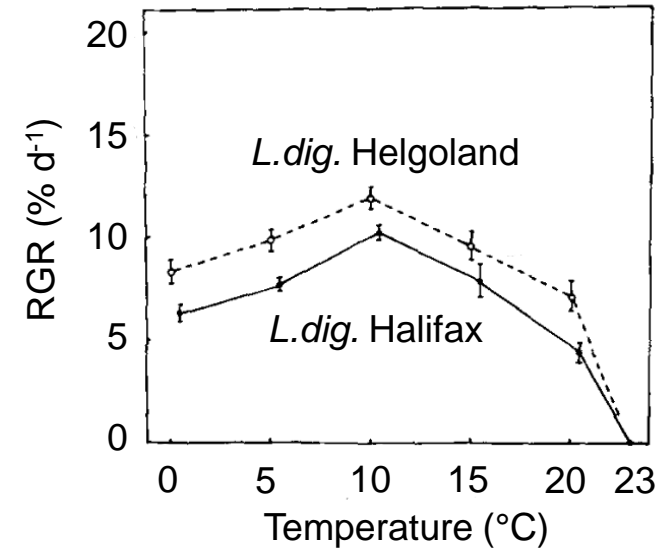
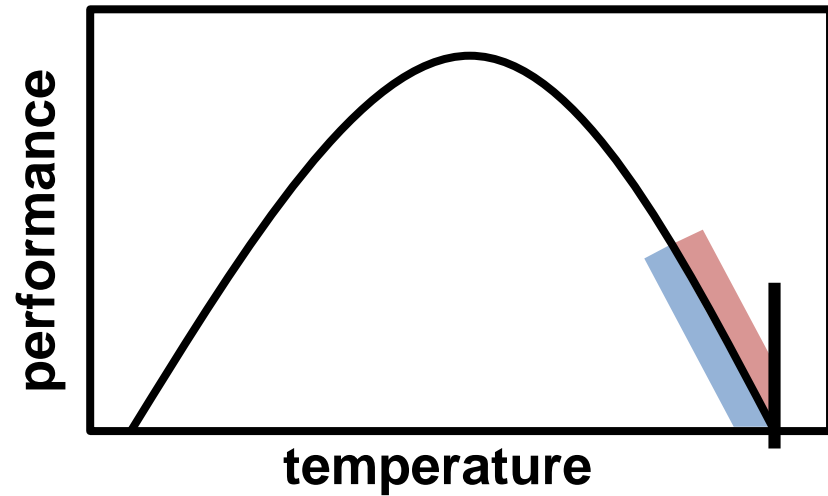
Fixed thermal
limit

Northern and
southern
clades

Subtle
differentiation
in marginal
populations

Genetic
diversity
 \neq
heat tolerance

Relevance



Loss of southern populations & range expansion of northern clade?

Thank you!



I thank

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Neusa Martins
AWIPEV
AWI diving team
Ulf Karsten
Juliane Müller
Angelika Graiff
Sanna Matsson

Also worth a look:

Kiara Franke's talk on *L. dig.* vs. *H. nigripes*
Nele Schimpf's poster on gametophyte UST

Further work:

1. Transgenerational effects
2. Parent-specific inheritance patterns



@lies_nerd

