Camouflage under climate change

Will marine species respond well to warming?

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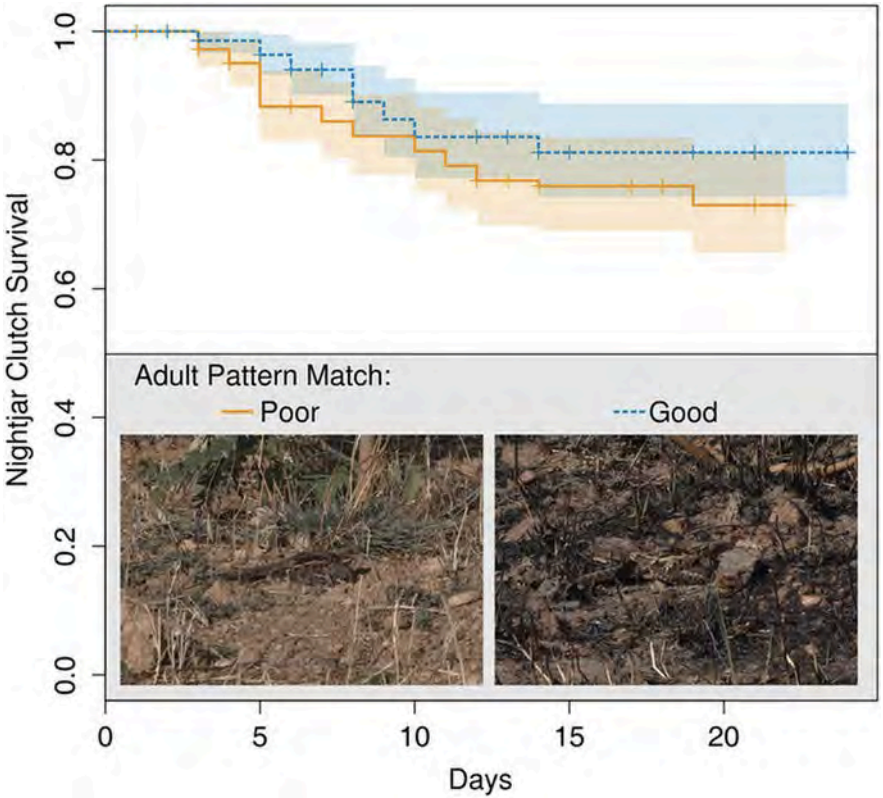
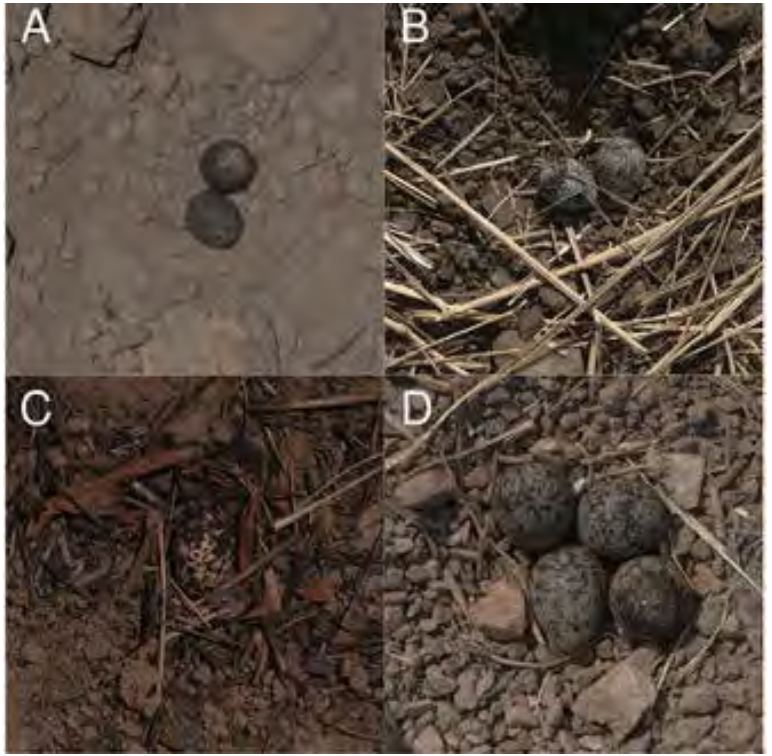
NERC GW4+ Doctoral Training Partnership

Predation is visually guided

Better camouflage means better survival



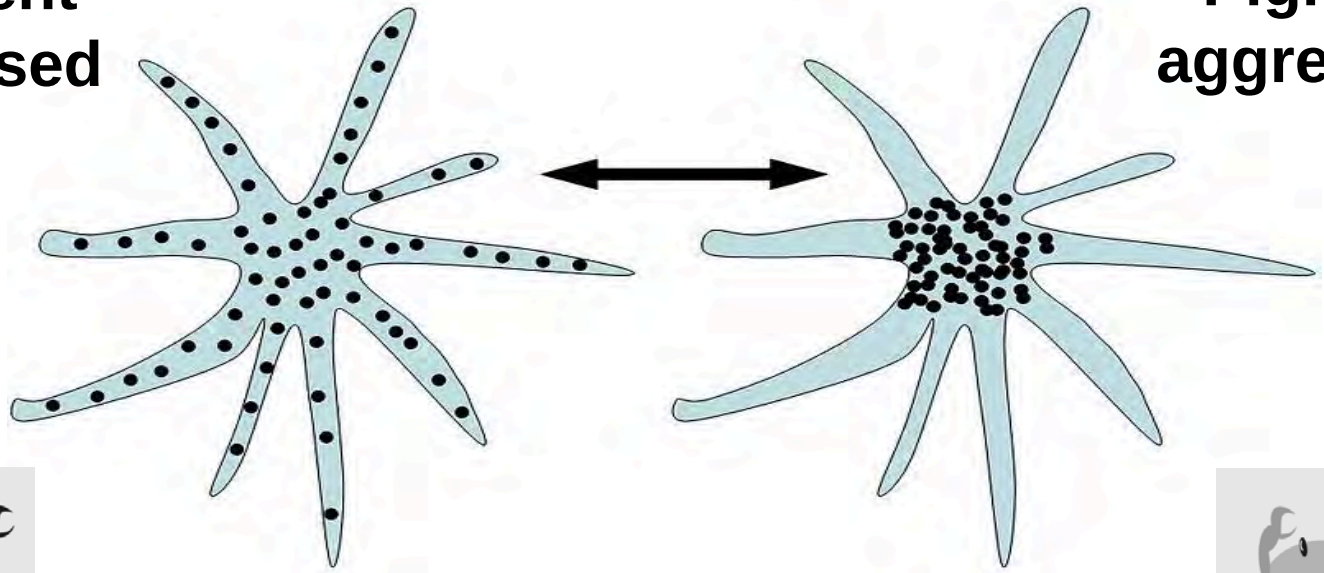


Individuals refine their camouflage

Why might warming affect background matching?

Pigment dispersed

Pigment aggregated



European green crabs

Carcinus maenas

Methods

Acclimatise
5-25 °C

New
substrate

Monitor
change

Model
appearance

Background matching

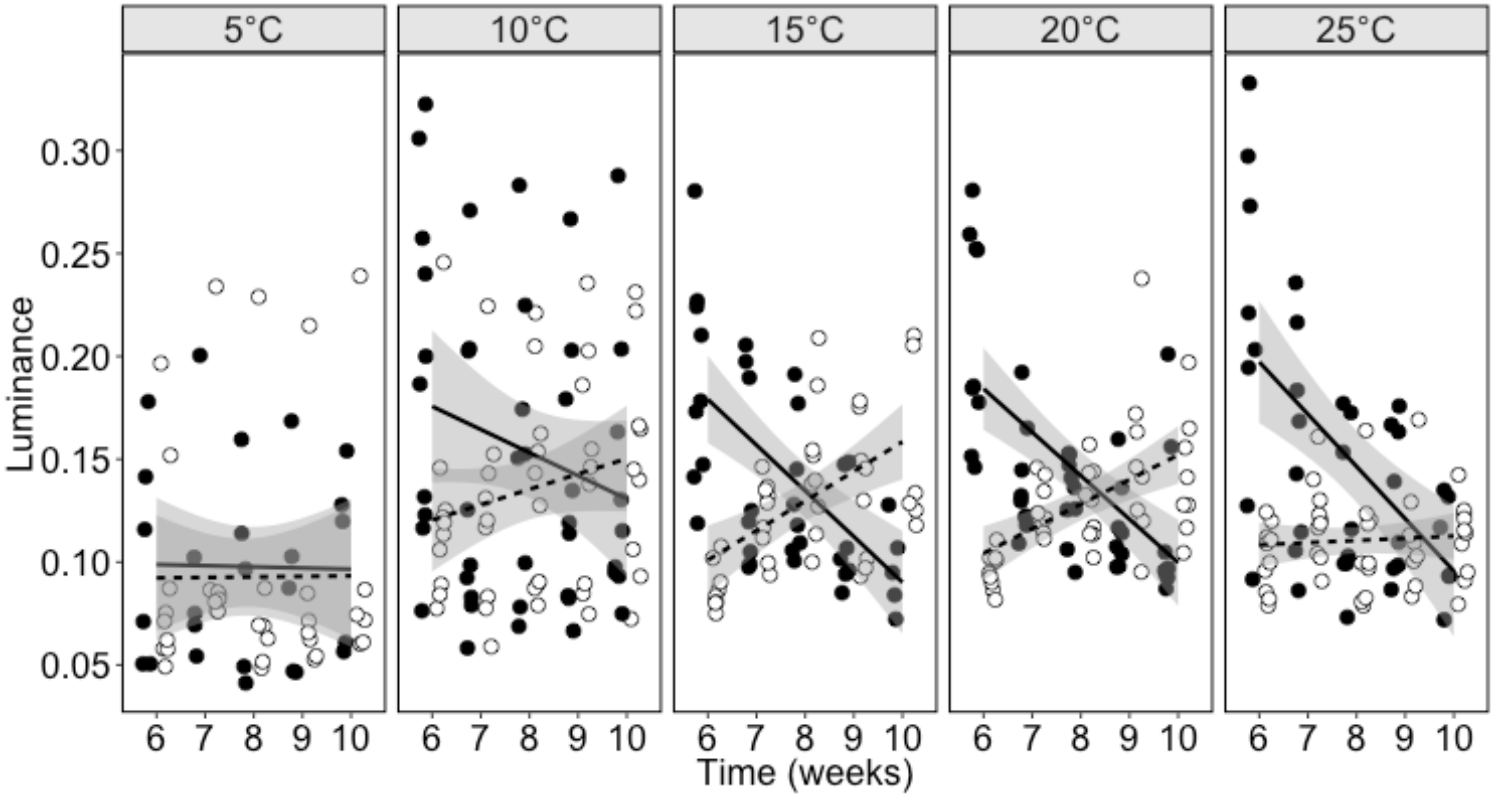
Matching white

Matching black

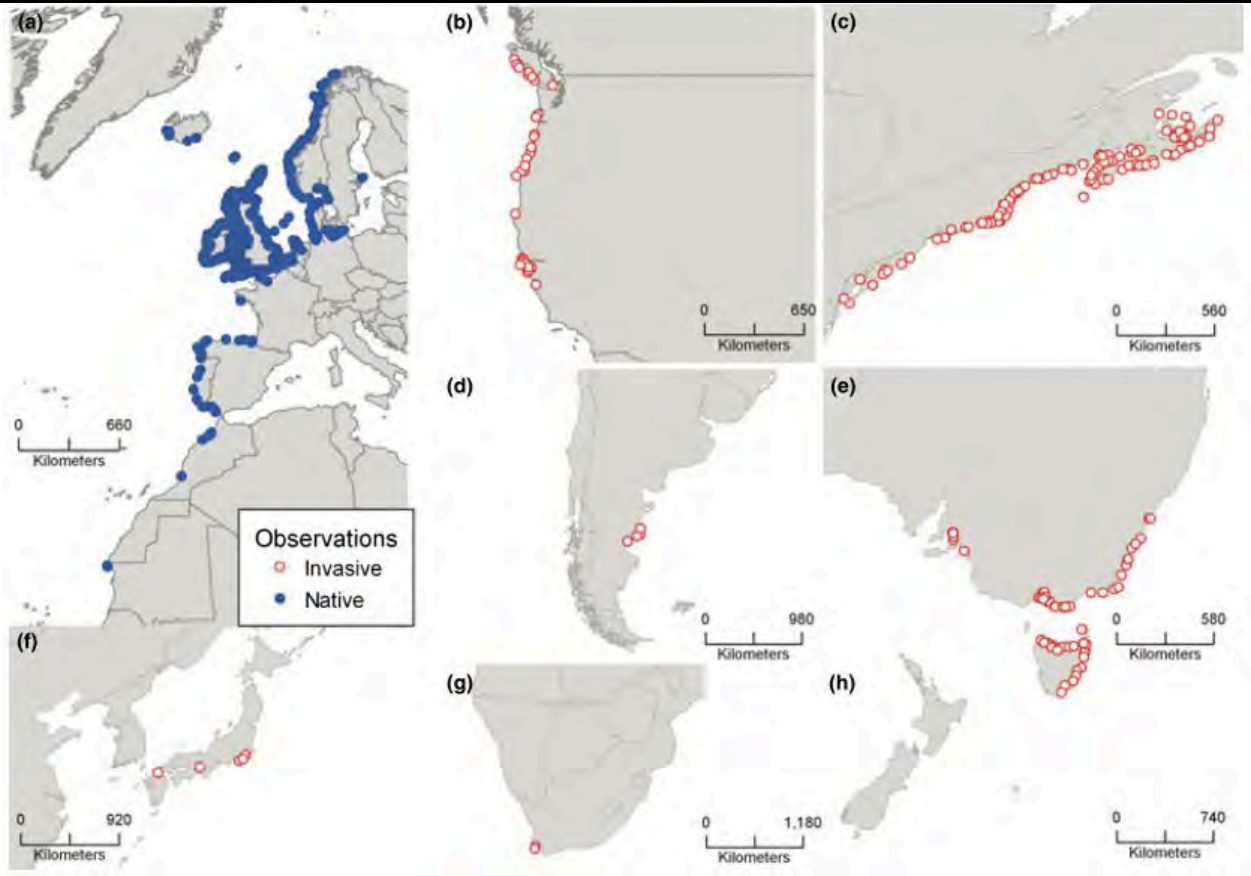
Thermal optimum

Light

Dark



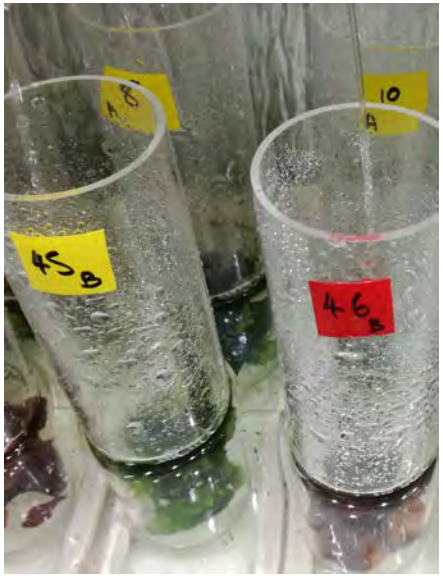
Wider implications



Chameleon prawns

Hippolyte varians

Methods



Acclimatise 17°C, 19°C

New substrate

Monitor change

Model appearance

Background matching

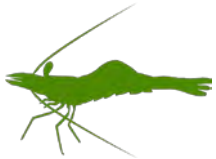
Sea lettuce, *Ulva lactuca*

Matching green

Dulse, *Palmaria palmata*

Matching red

Tolerance

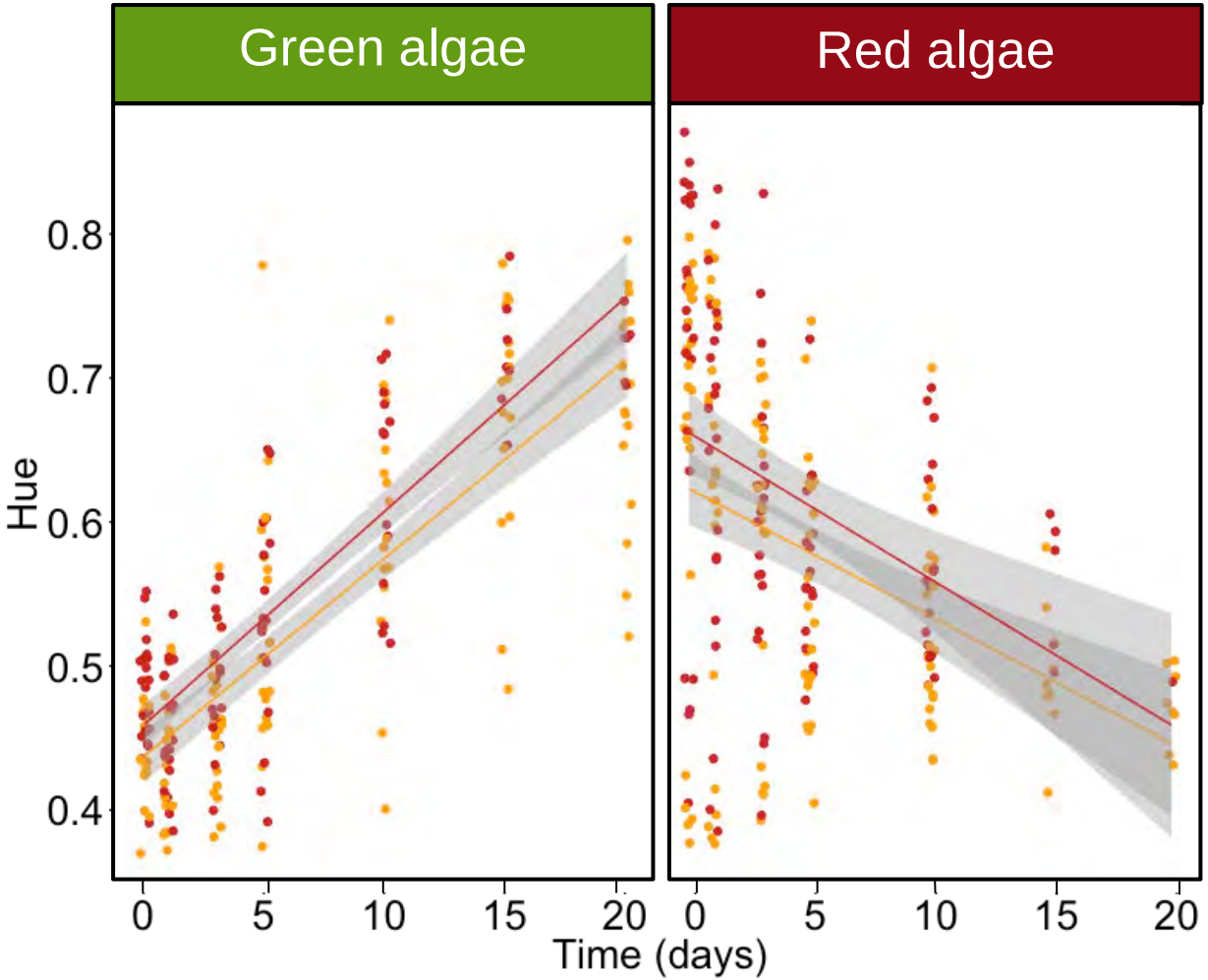


Green

Tolerate end of century conditions

Red

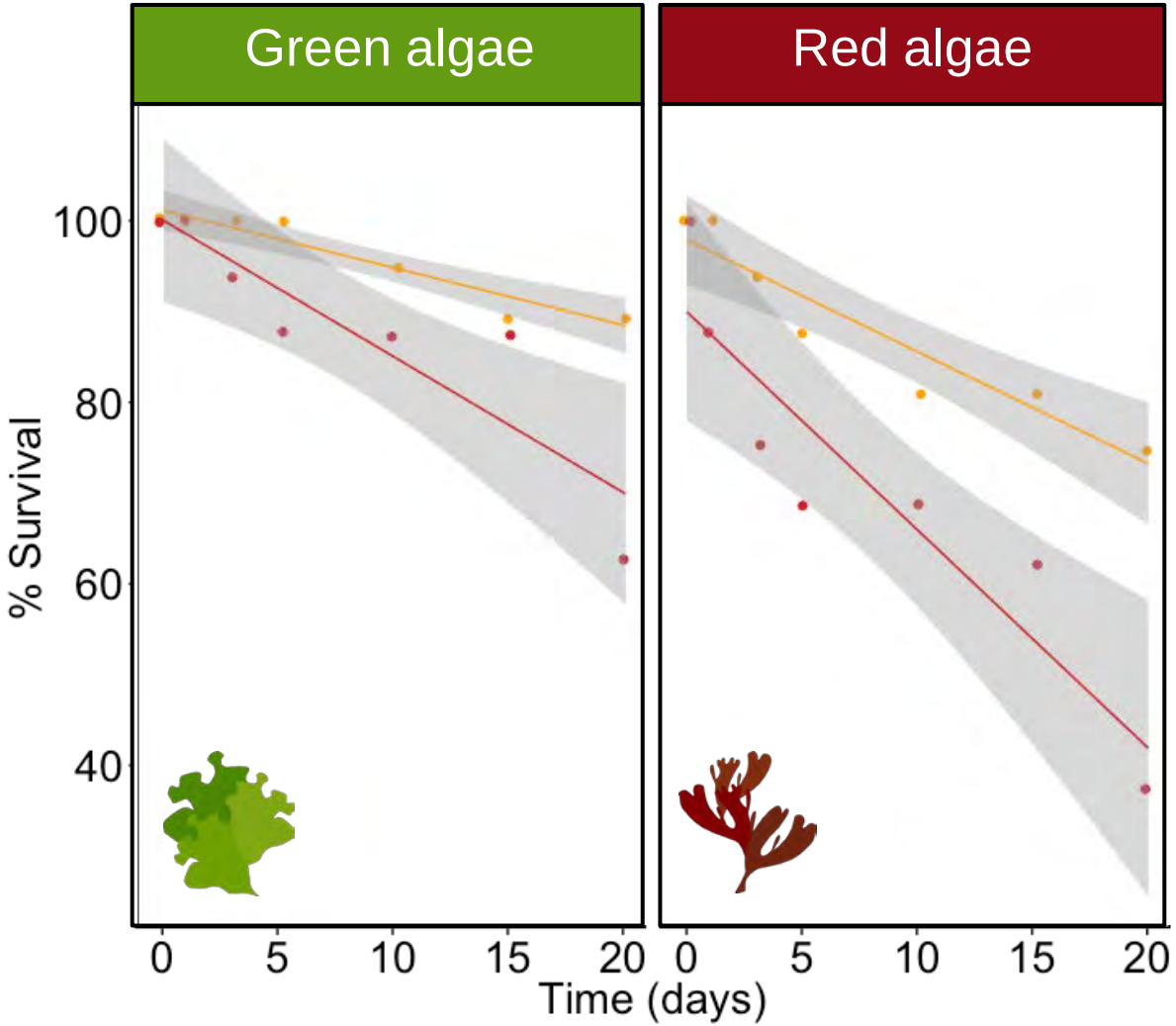
- 17 °C (summer max.)
- 19 °C (end of century)



Trade-off

- 17 °C (summer max.)
- 19 °C (end of century)

Greater mortality under end of century conditions



Conclusions

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- Camouflage can be temperature dependent & the response varies with species
- Ocean warming will not adversely affect background matching
- Need approaches that consider multiple species & multiple responses