Camouflage under climate change
Will marine species respond well to warming?

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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*  
Dulse, *Palmaria palmata*

Matching green  
Matching red
Tolerance

Tolerate end of century conditions

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

Greater mortality under end of century conditions

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

- Red algae

Graph showing survival over time for both green and red algae under different temperature conditions.
Conclusions

- 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