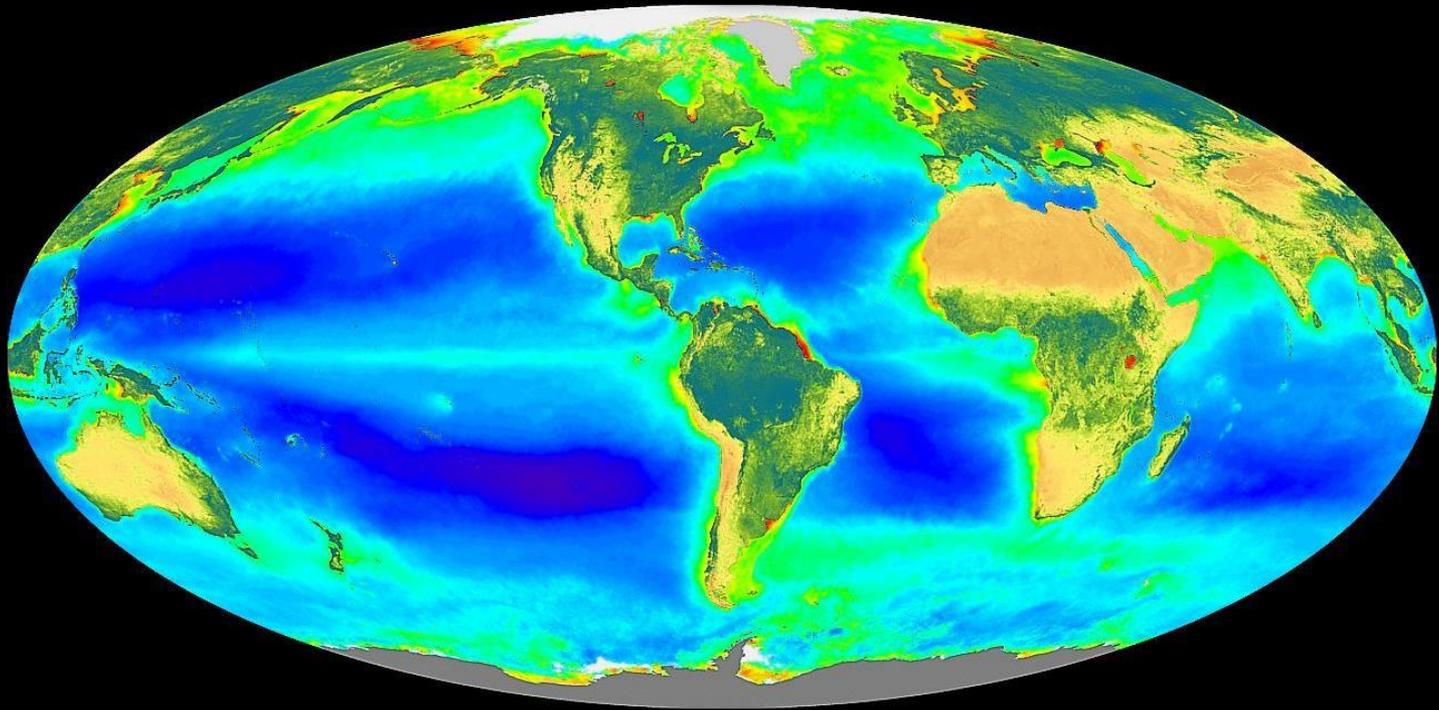


# Limited effects of pigment richness on phytoplankton communities

Jürg Spaak

Frederik De Laender

# Phytoplankton are microscopic aquatic plants



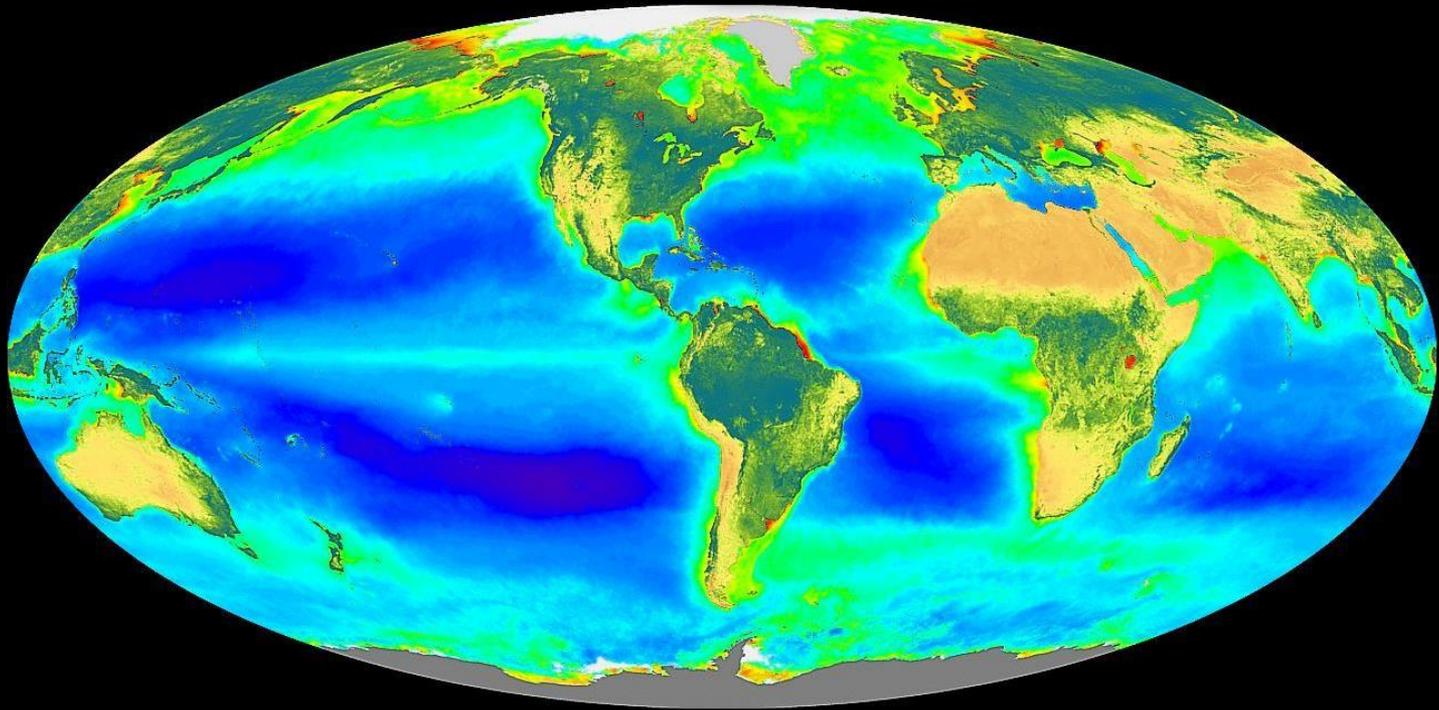
low



high

Phytoplankton concentration

# Phytoplankton are microscopic aquatic plants



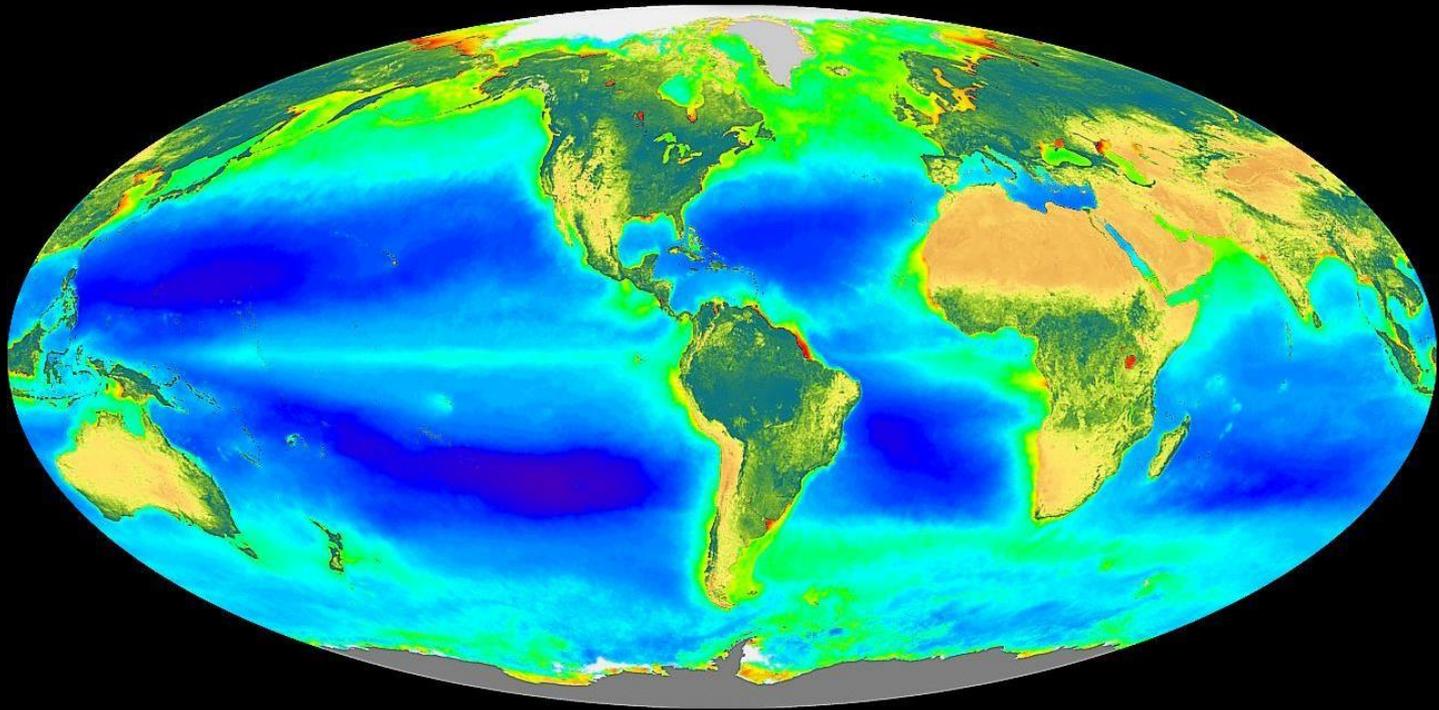
low



high

Phytoplankton concentration  
Nutrient concentration

# Phytoplankton are microscopic aquatic plants



low

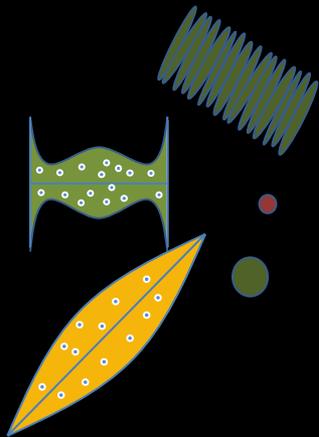


high

Phytoplankton concentration  
Nutrient concentration  
Competition for light

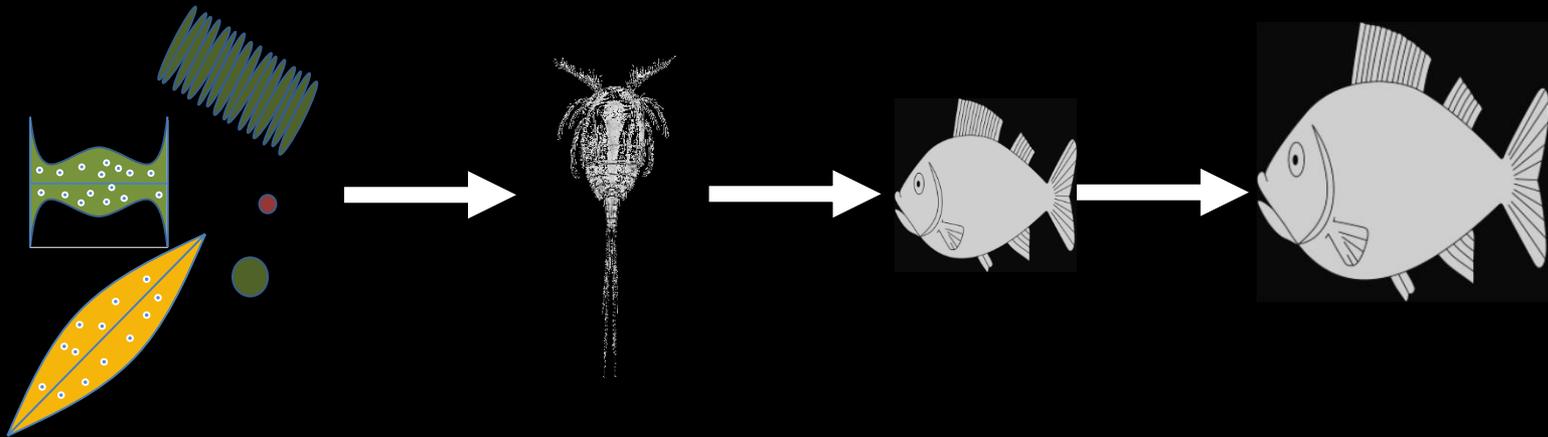
# Phytoplankton are important because they ...

- produce oxygen (50% of all oxygen)



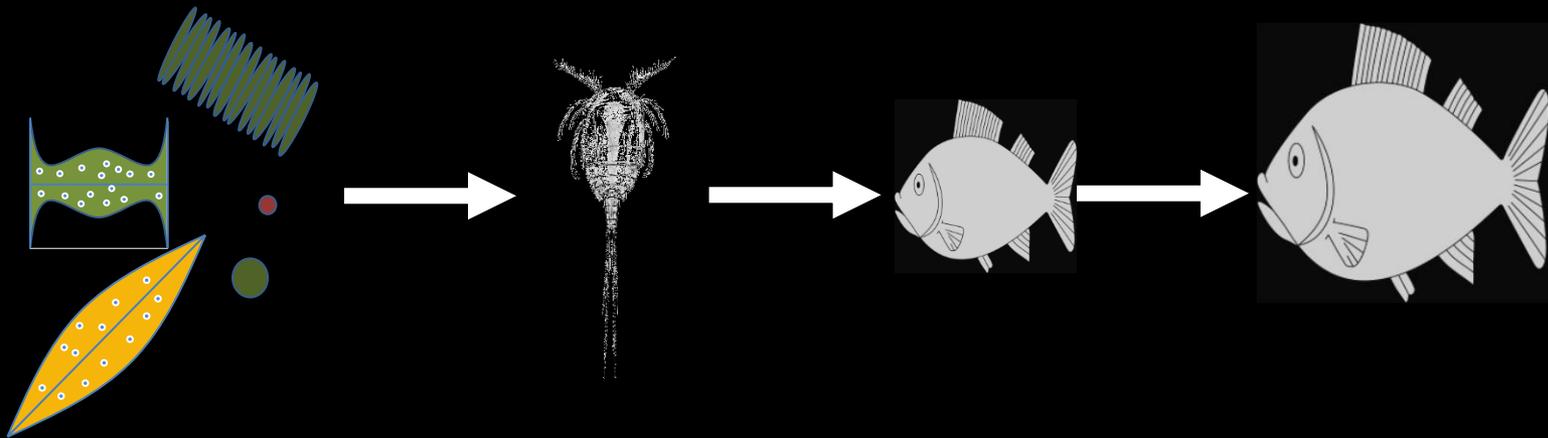
# Phytoplankton are important because they ...

- produce oxygen (50% of all oxygen)
- are the basis of all aquatic foodwebs



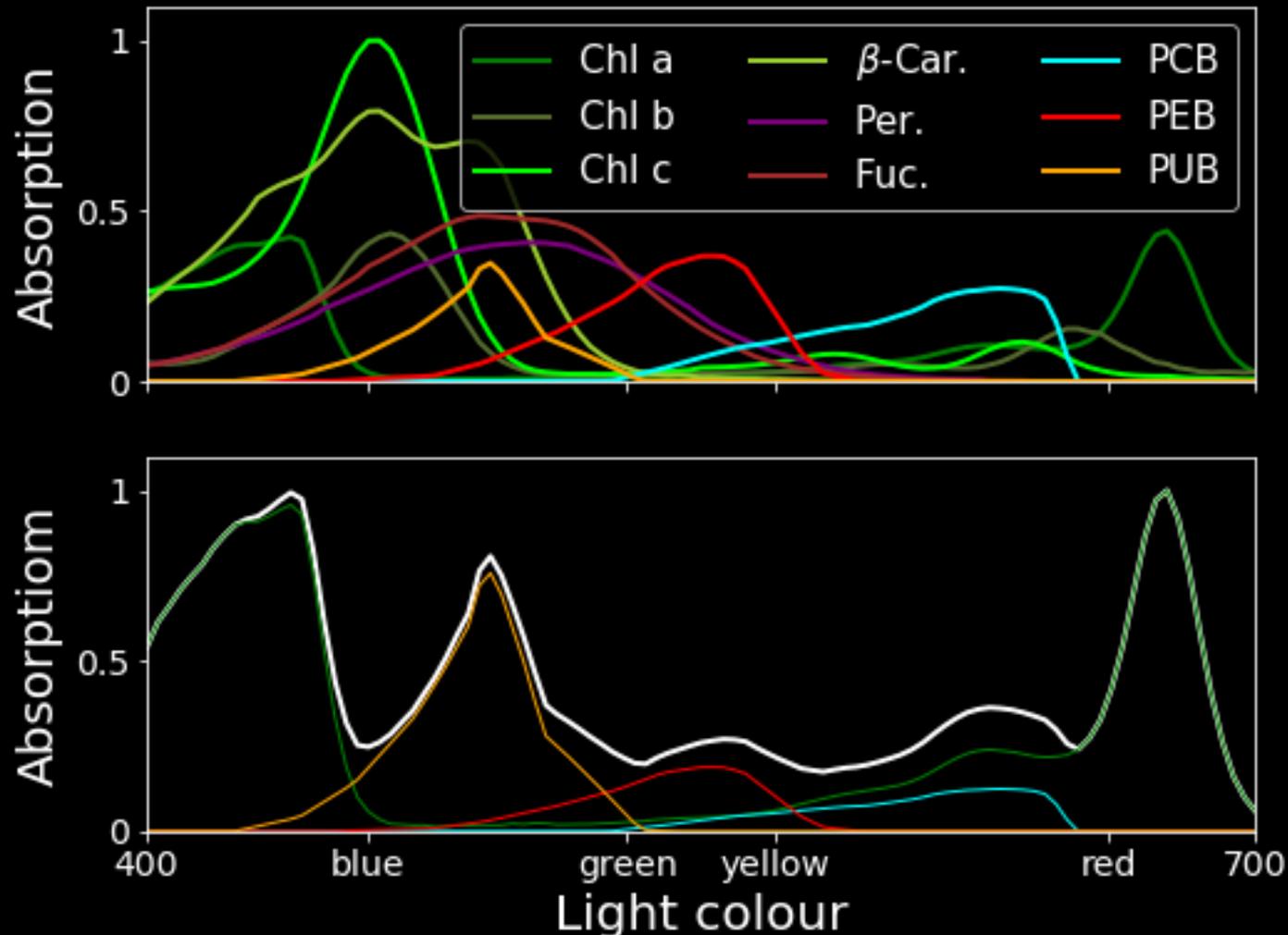
# Phytoplankton are important because they ...

- produce oxygen (50% of all oxygen)
- are the basis of all aquatic foodwebs
- Increase fishery yield

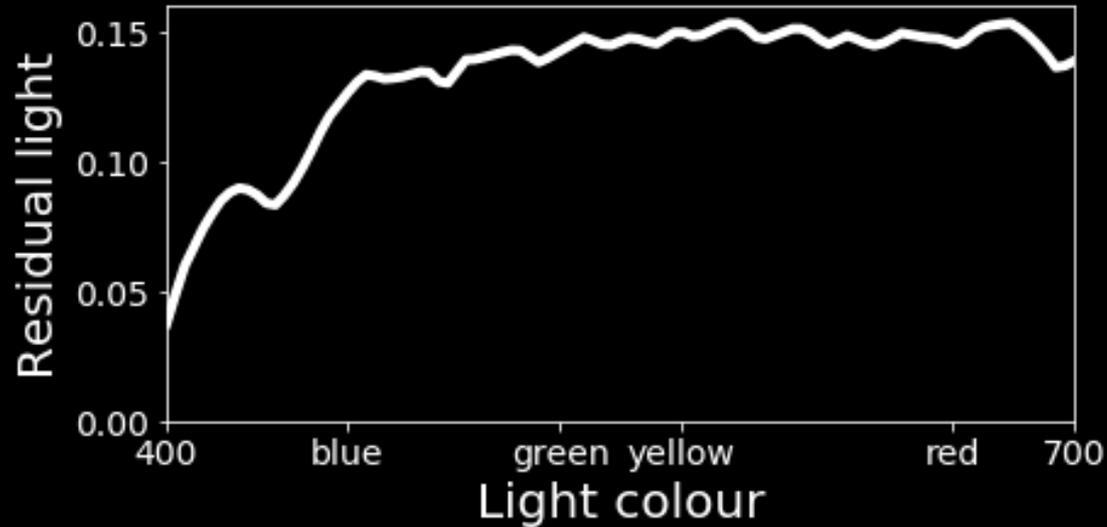




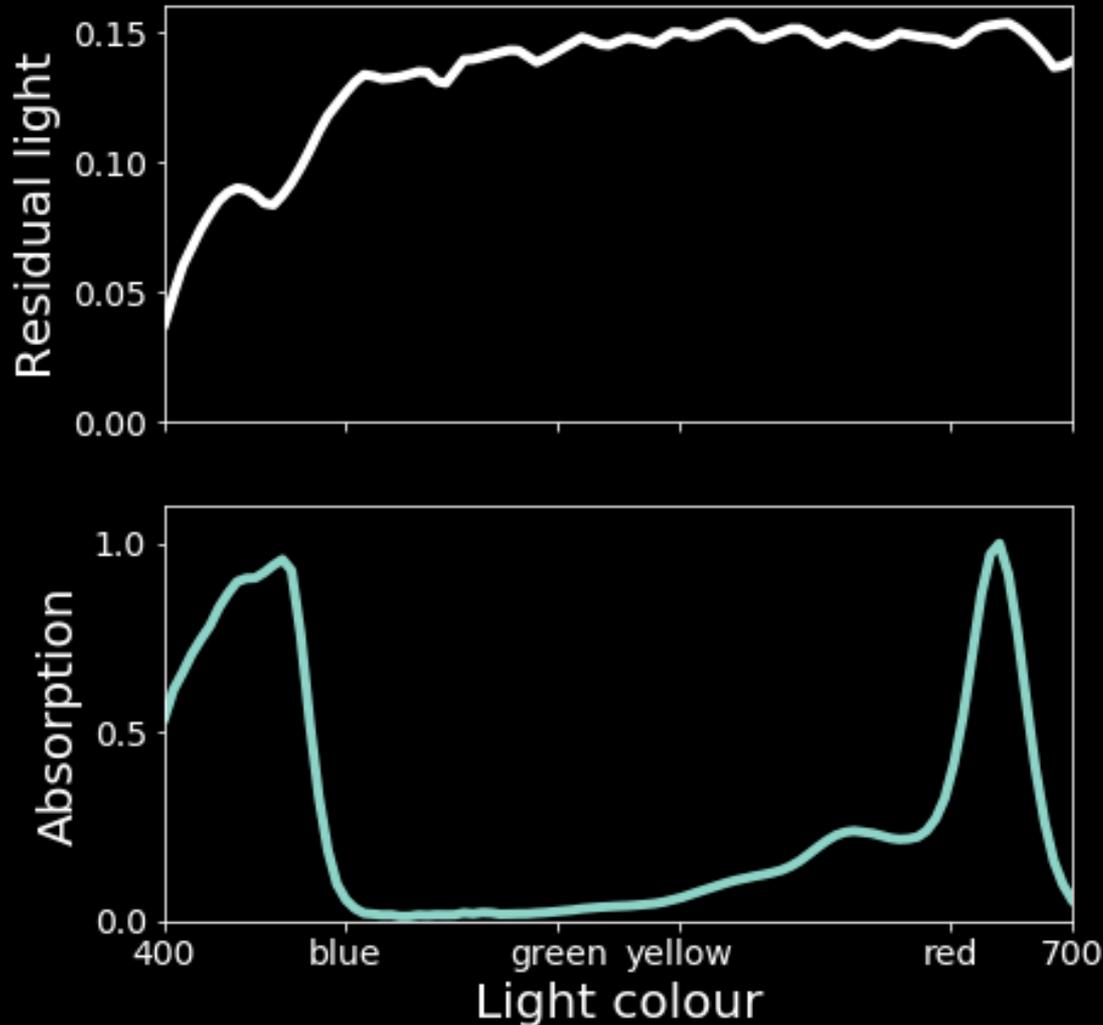
# Phytoplankton use different pigments to absorb different light colours



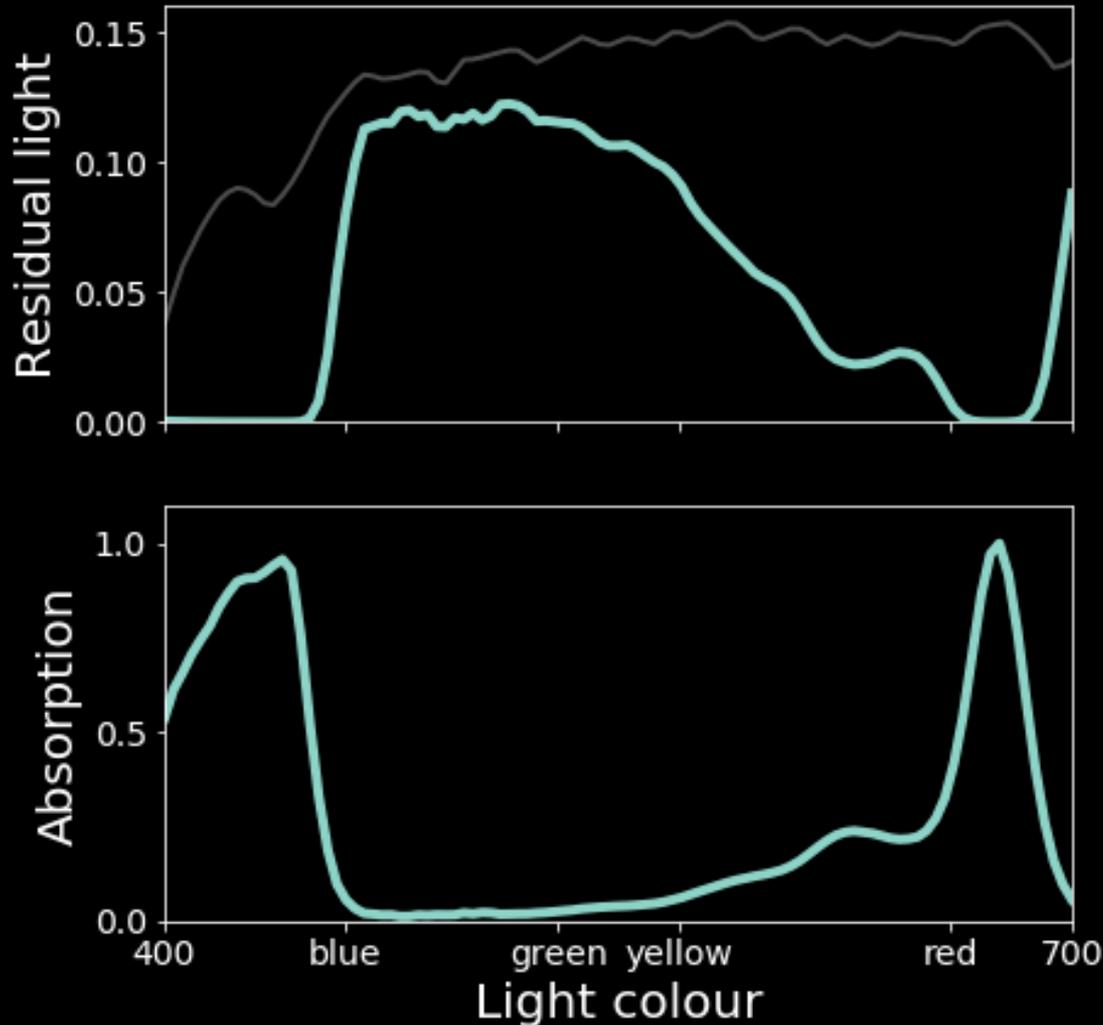
# Pigment richness promotes total light attenuation



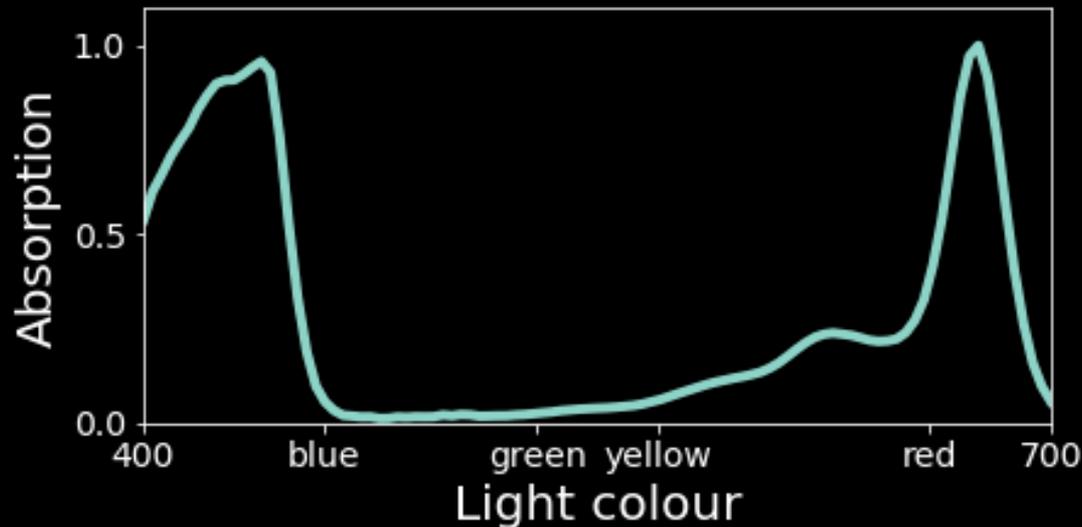
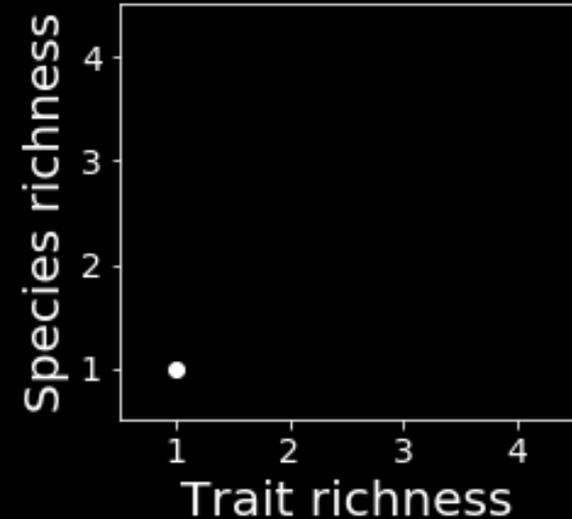
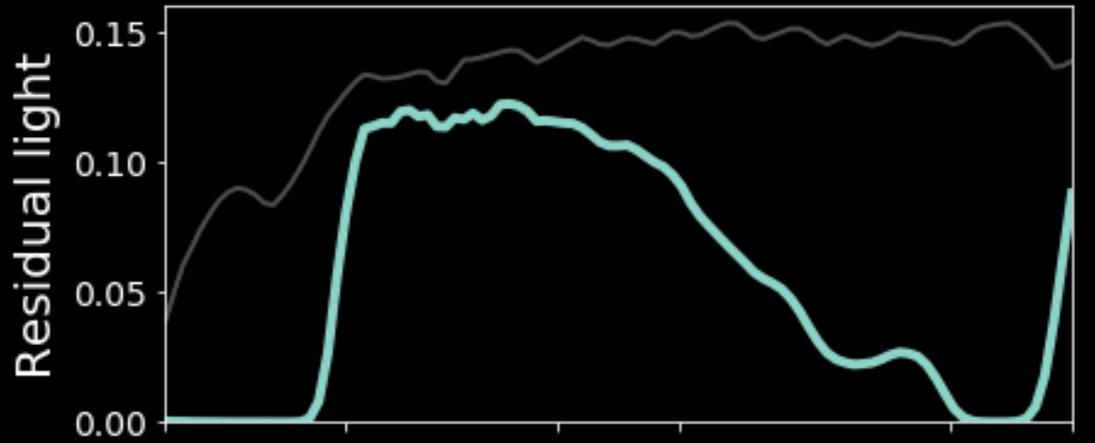
# Pigment richness promotes total light attenuation



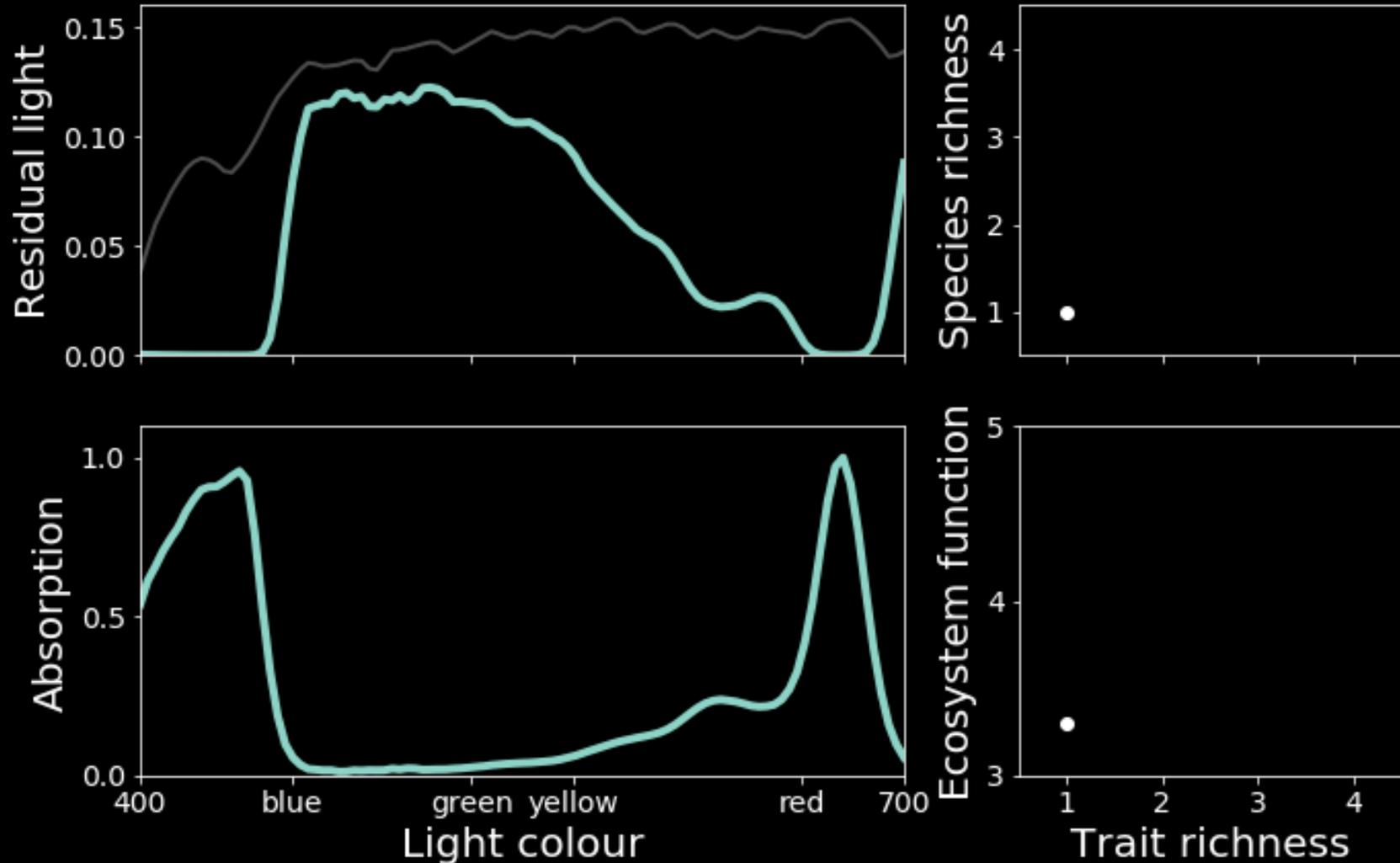
# Pigment richness promotes total light attenuation



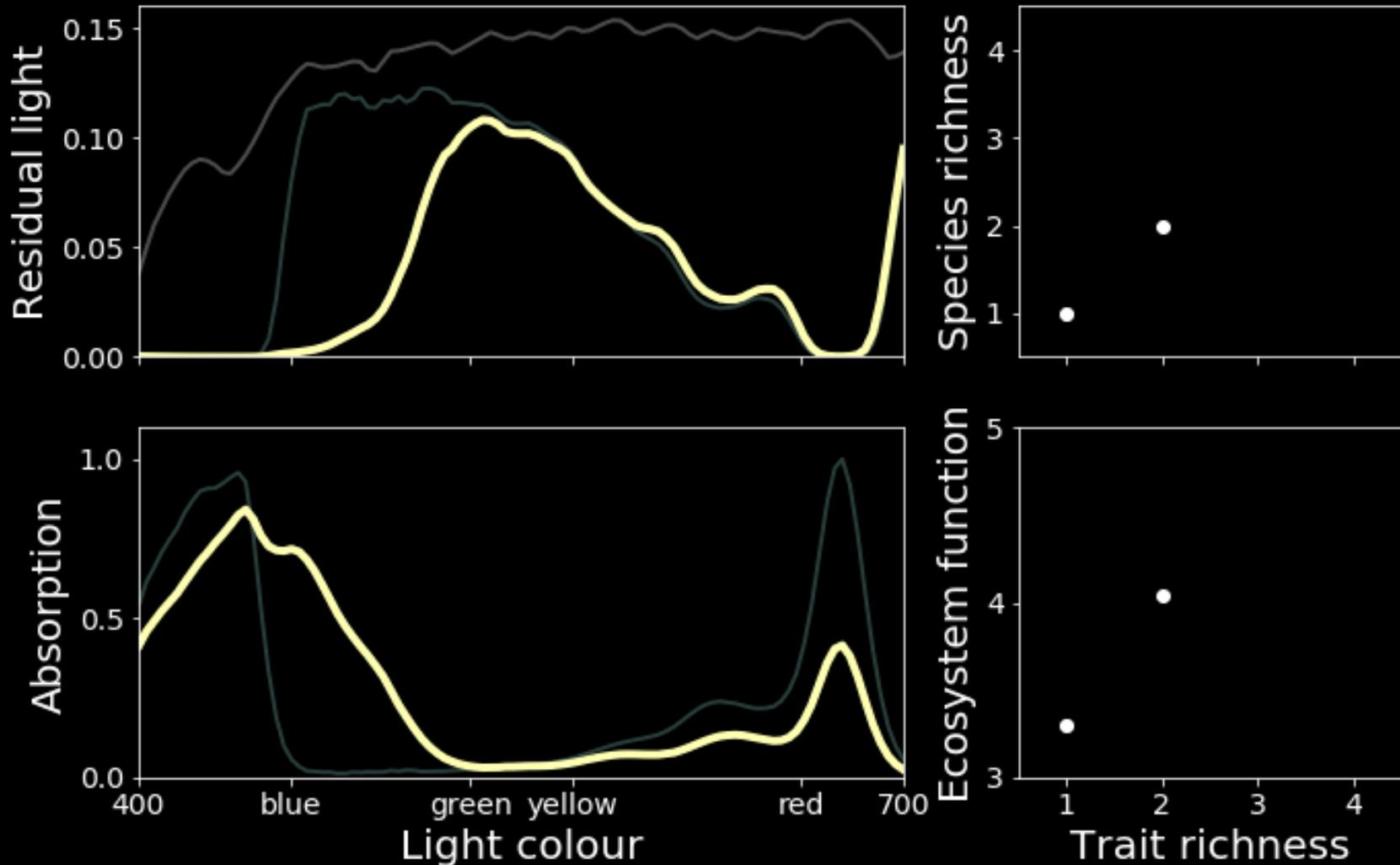
# Pigment richness promotes total light attenuation



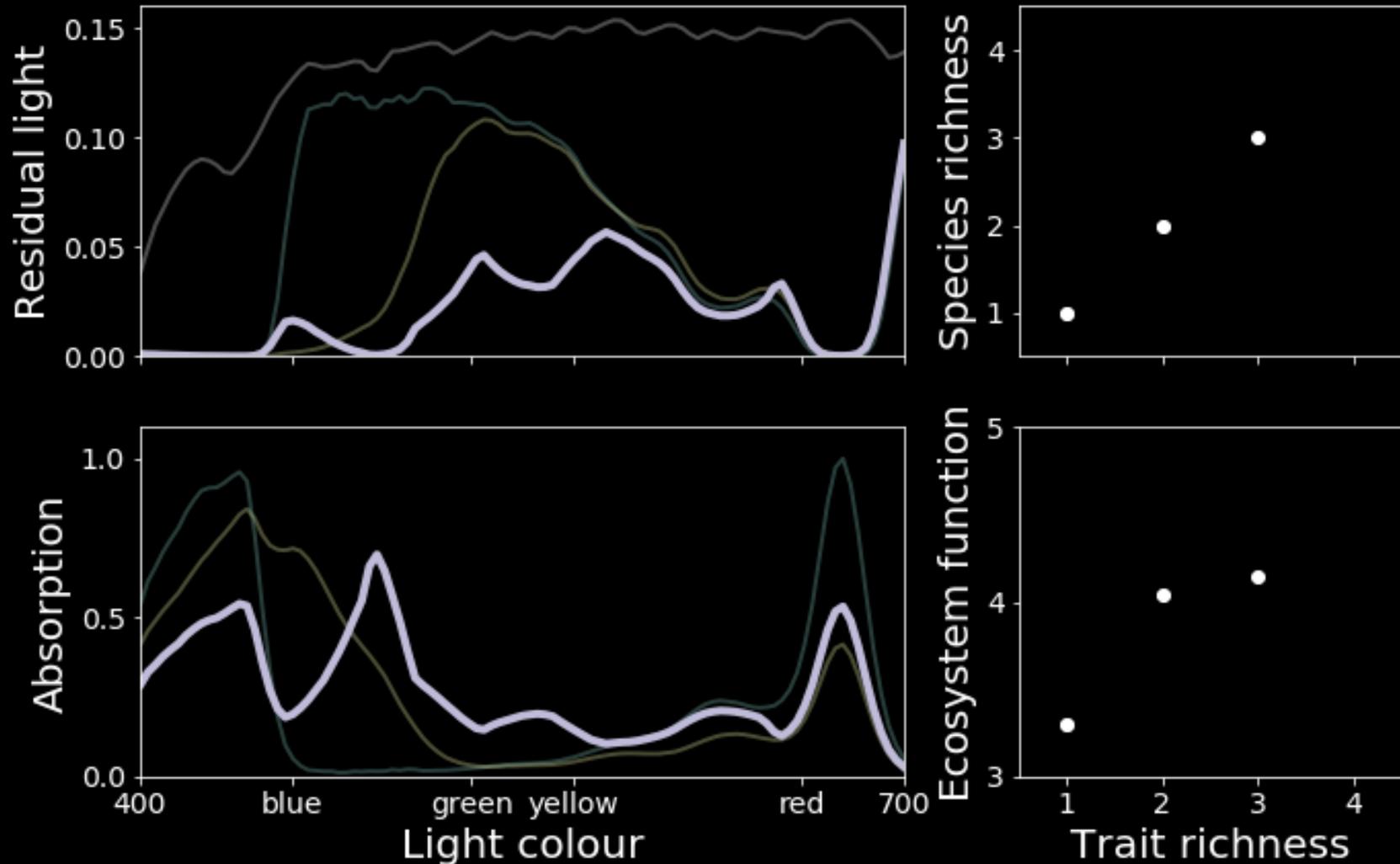
# Pigment richness promotes total light attenuation



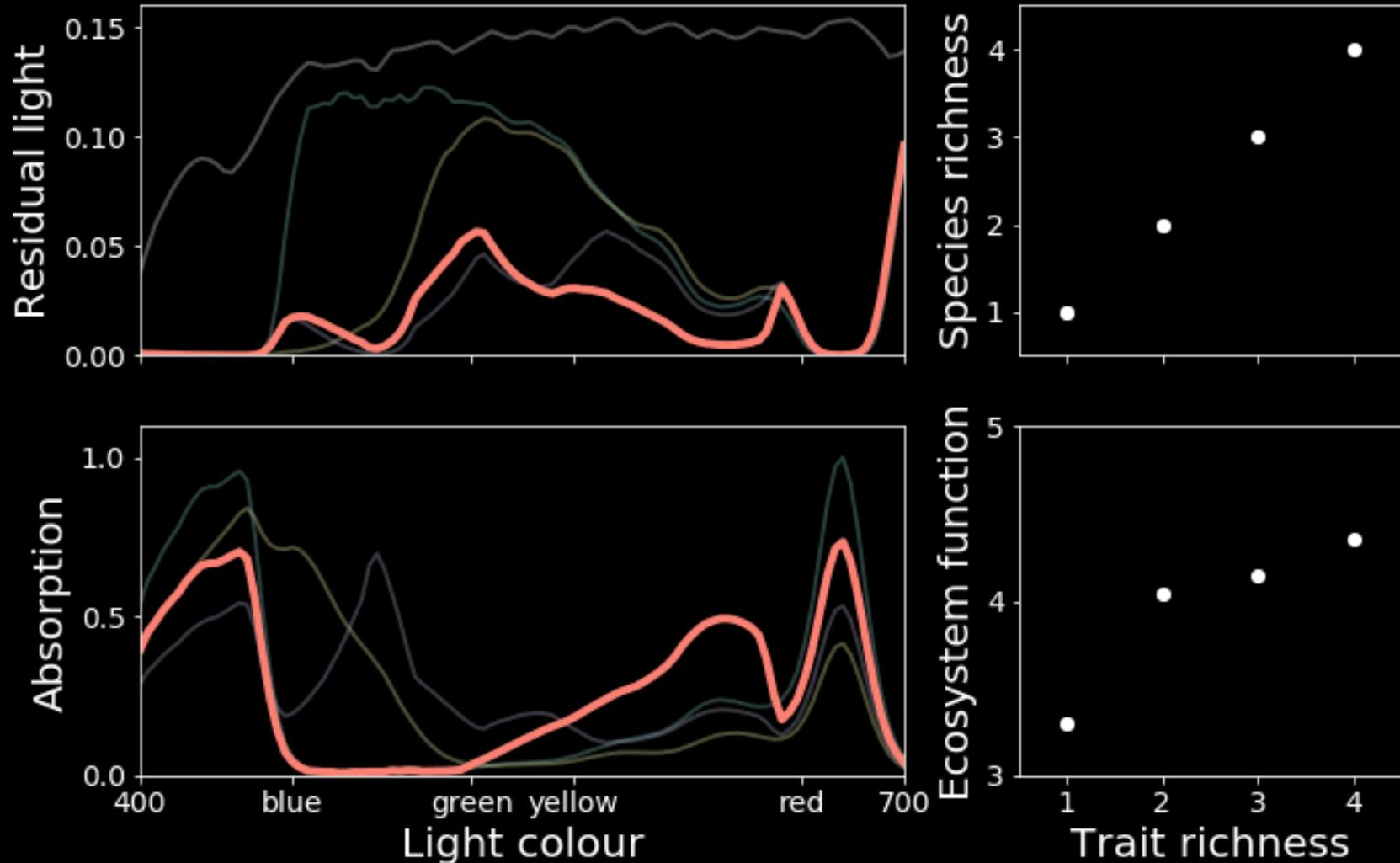
# Pigment richness promotes total light attenuation



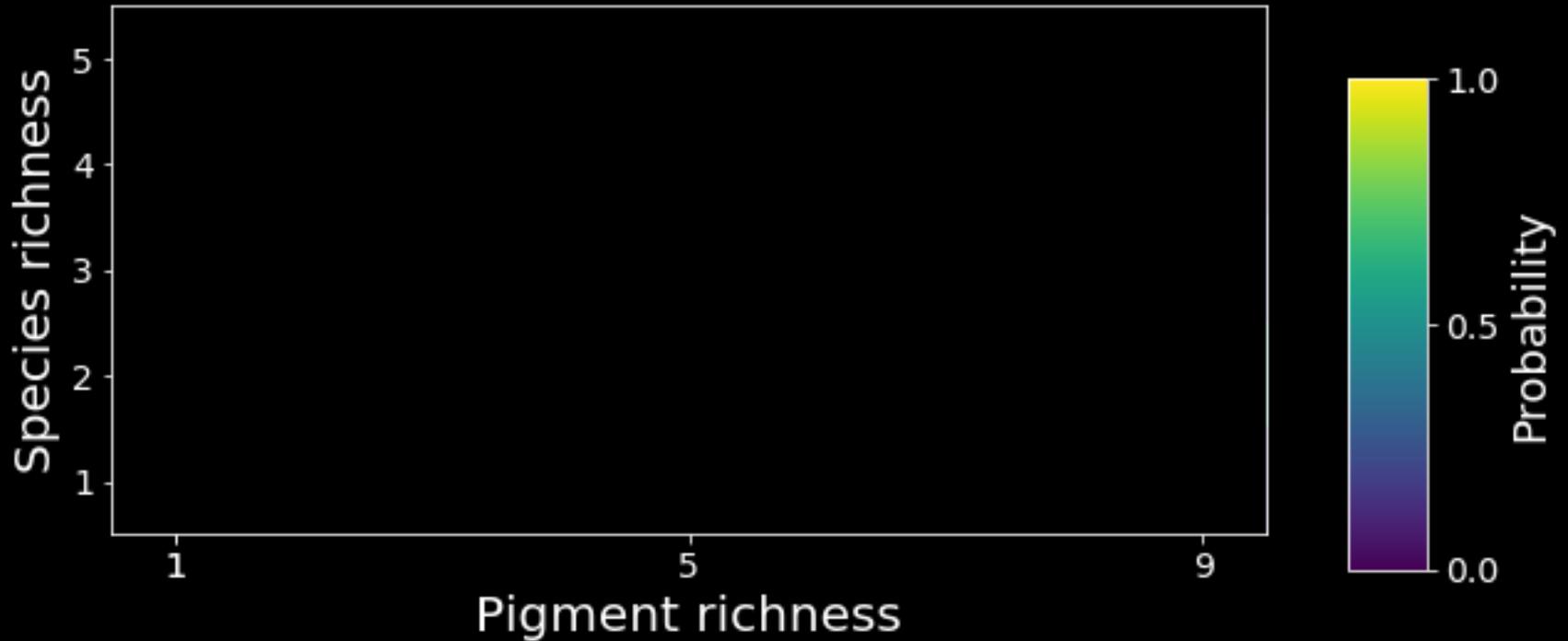
# Pigment richness promotes total light attenuation



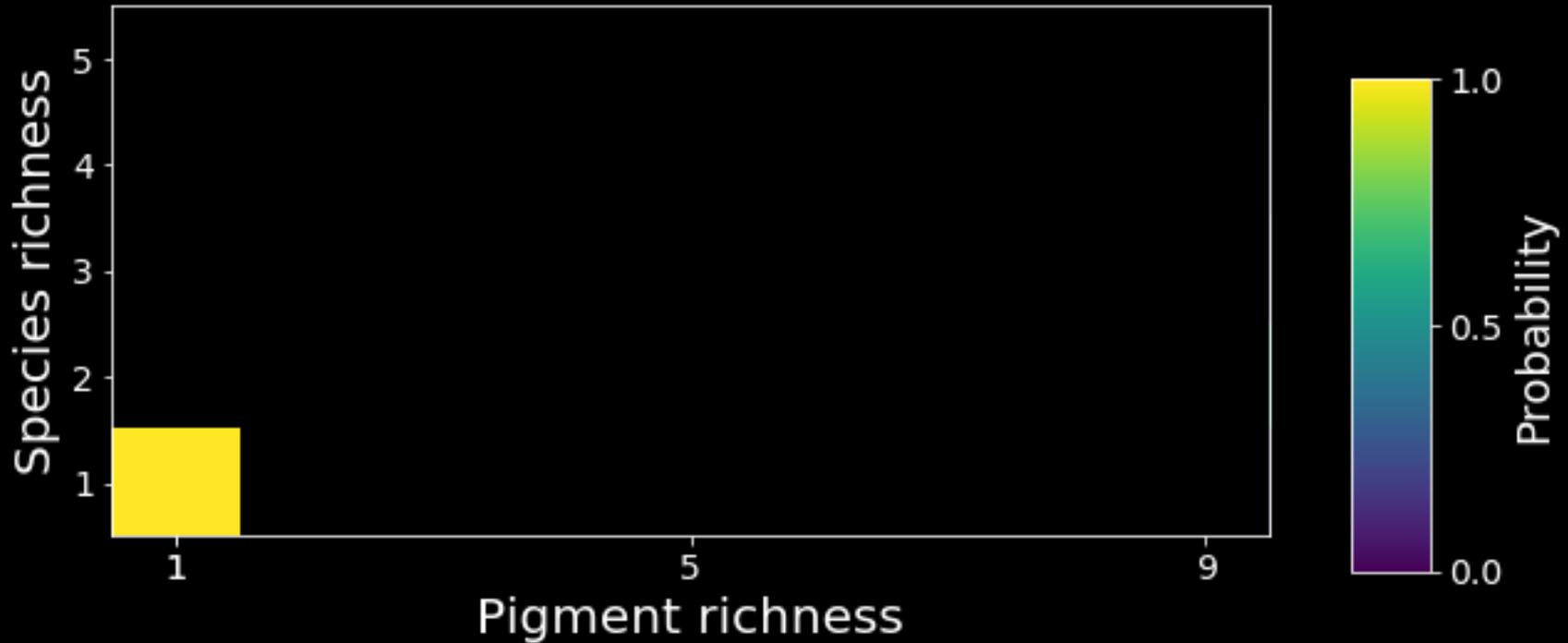
# Pigment richness promotes total light attenuation



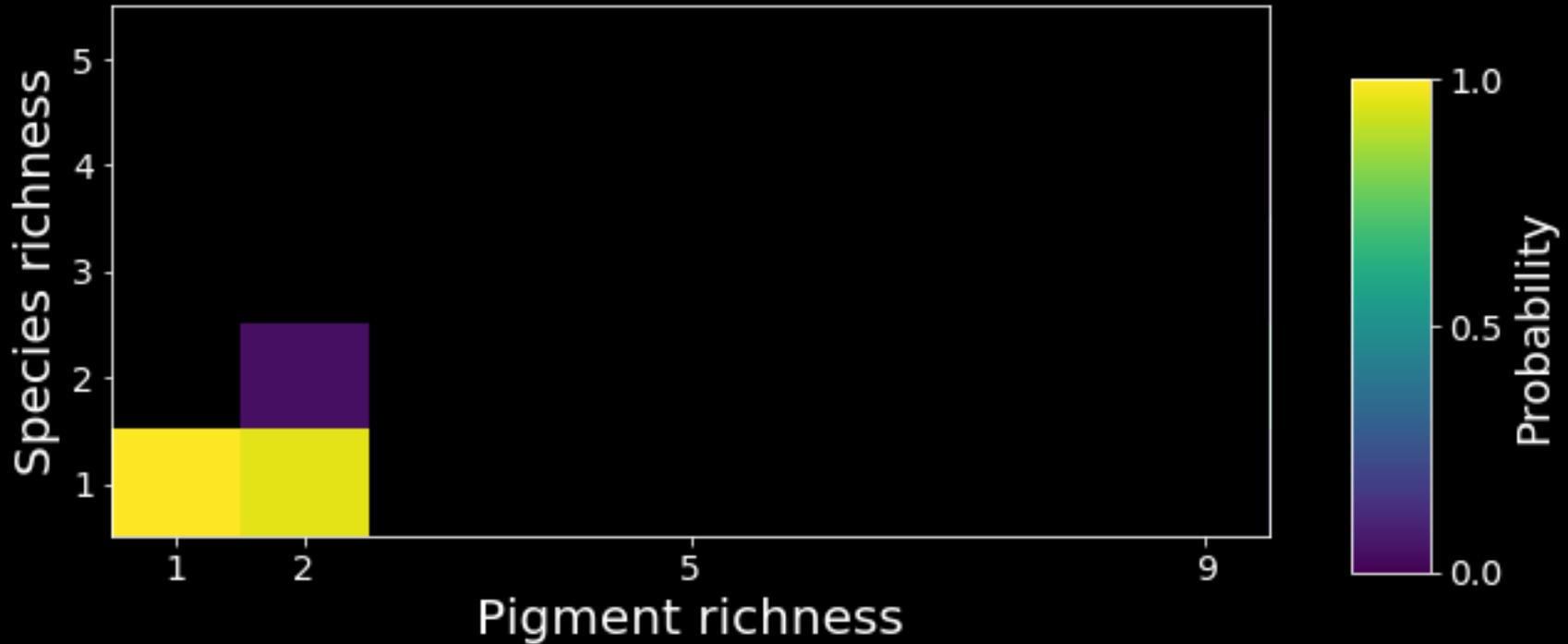
# Species richness saturates with species richness



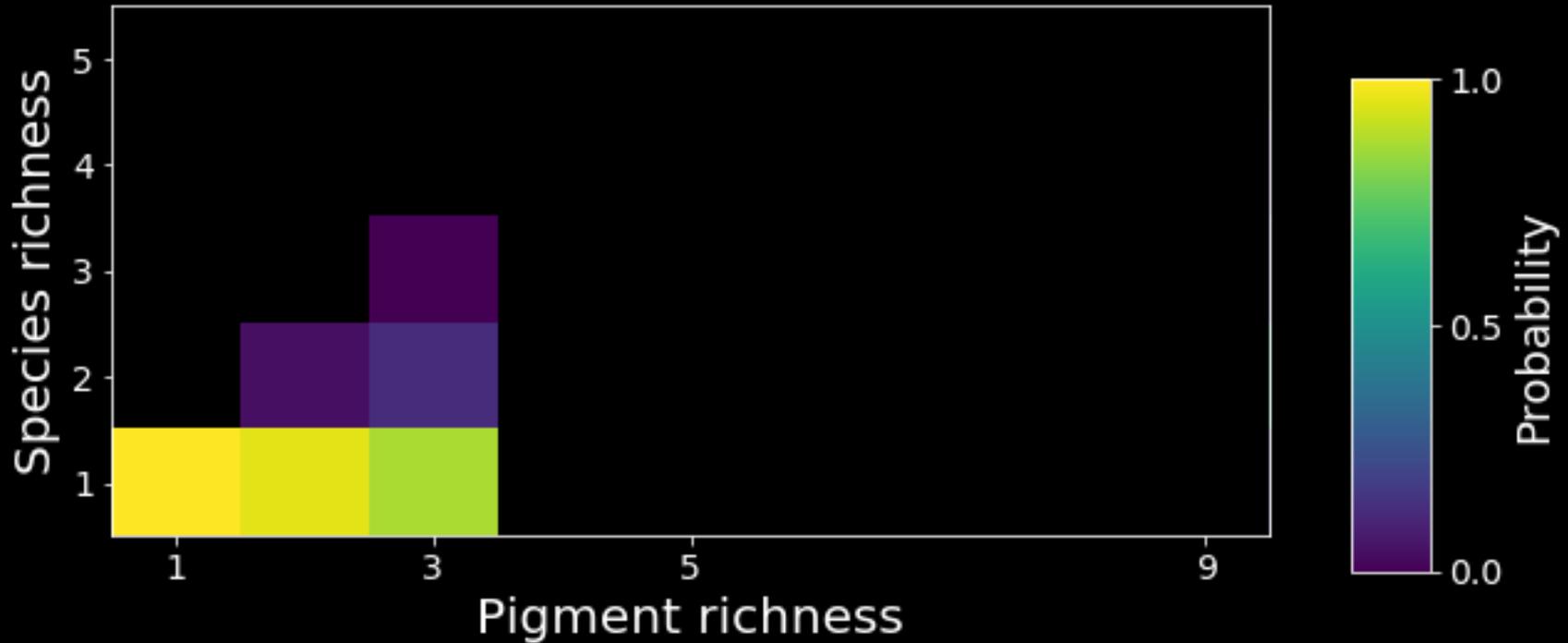
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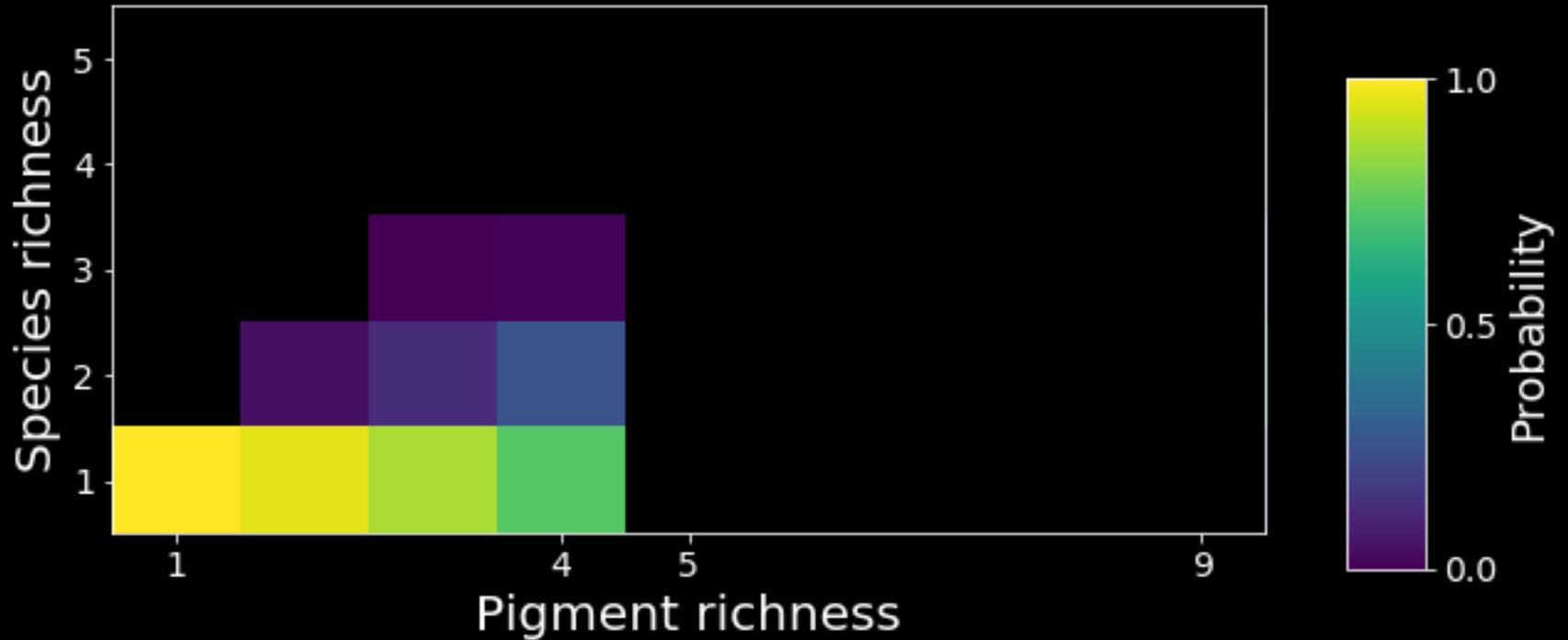
# Species richness saturates with species richness



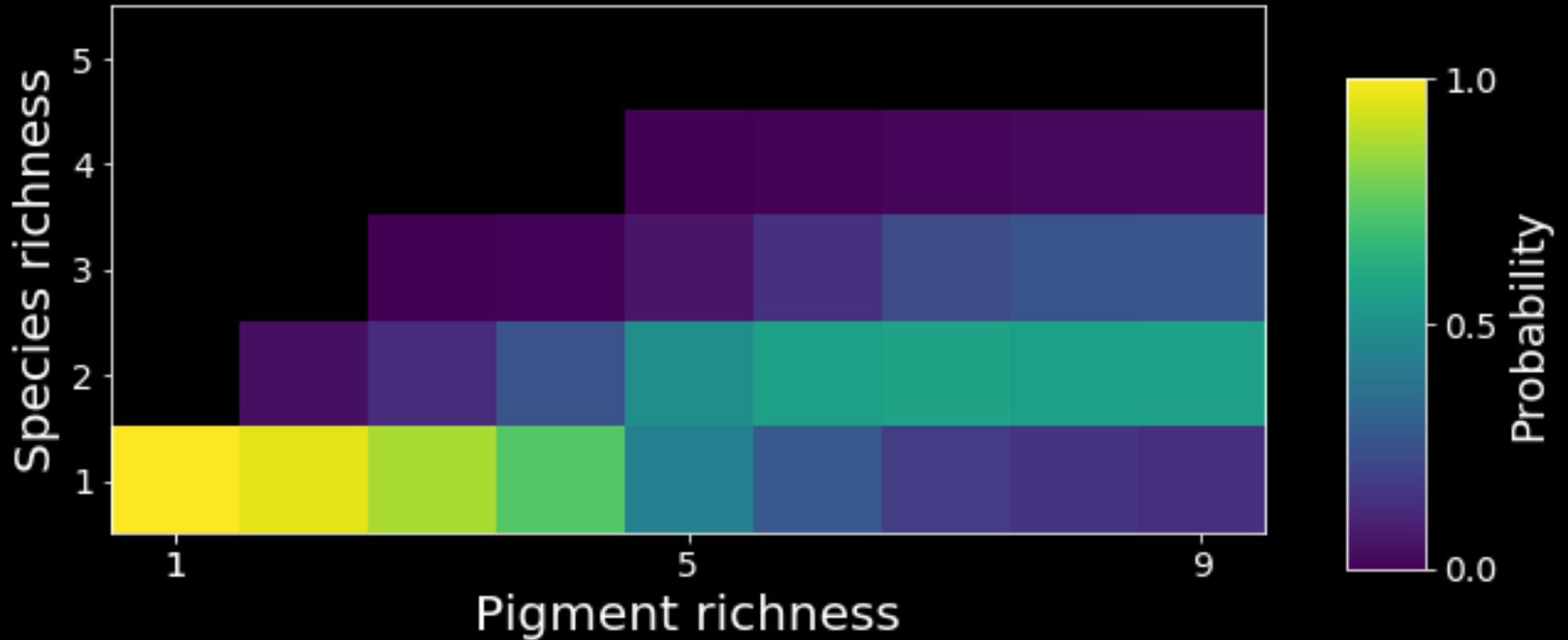
# Species richness saturates with species richness



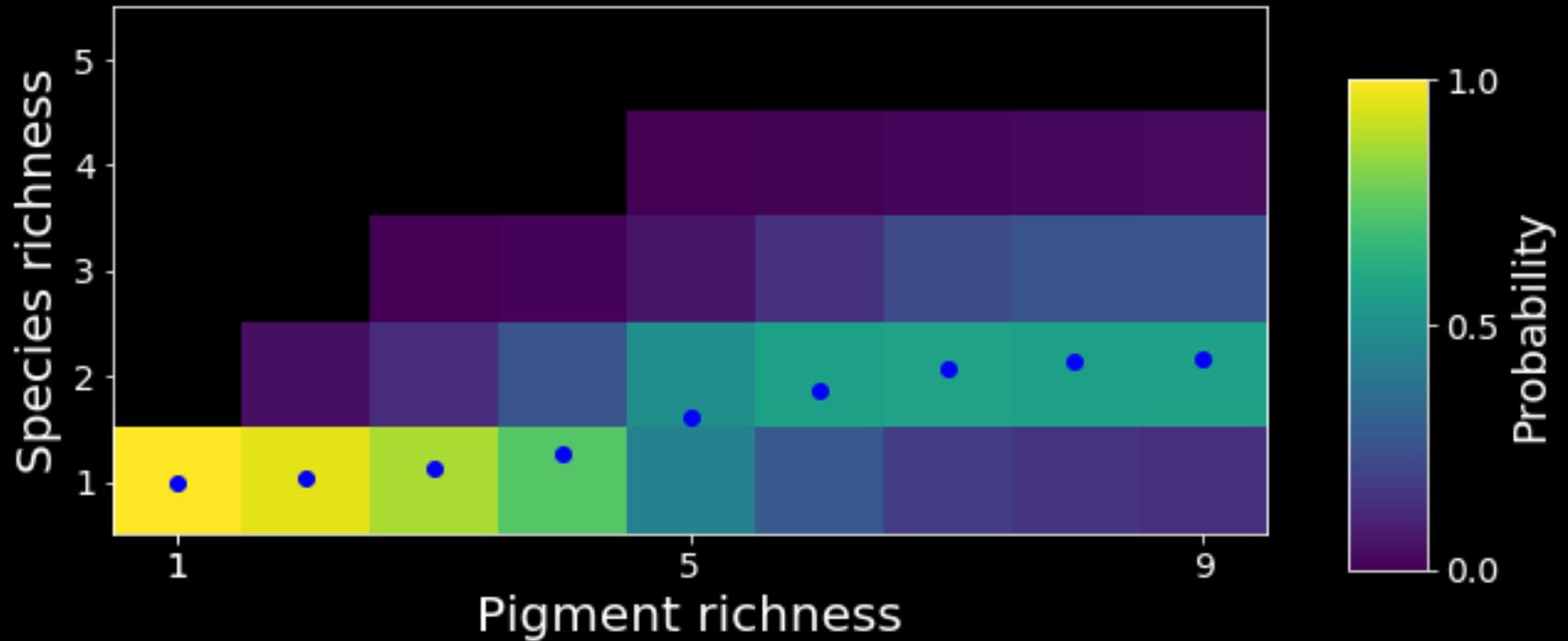
# Species richness saturates with species richness



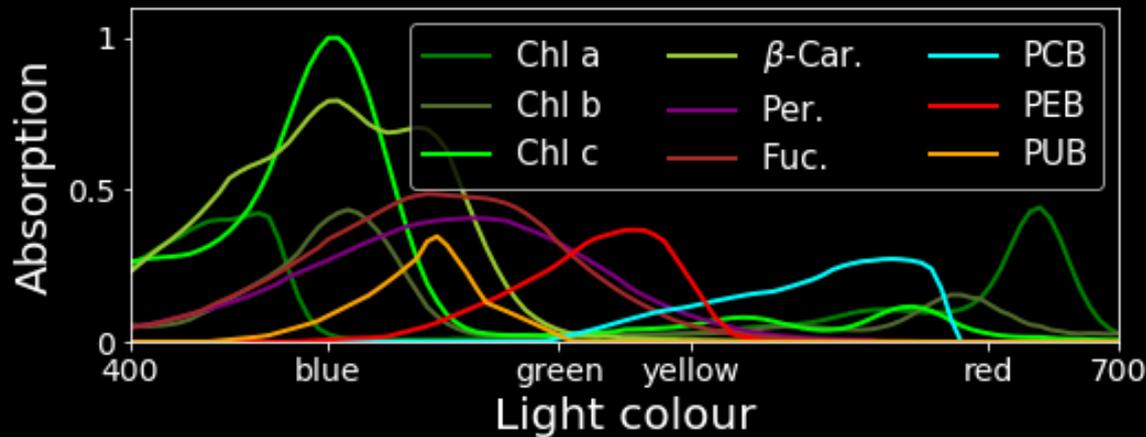
# Species richness saturates with species richness



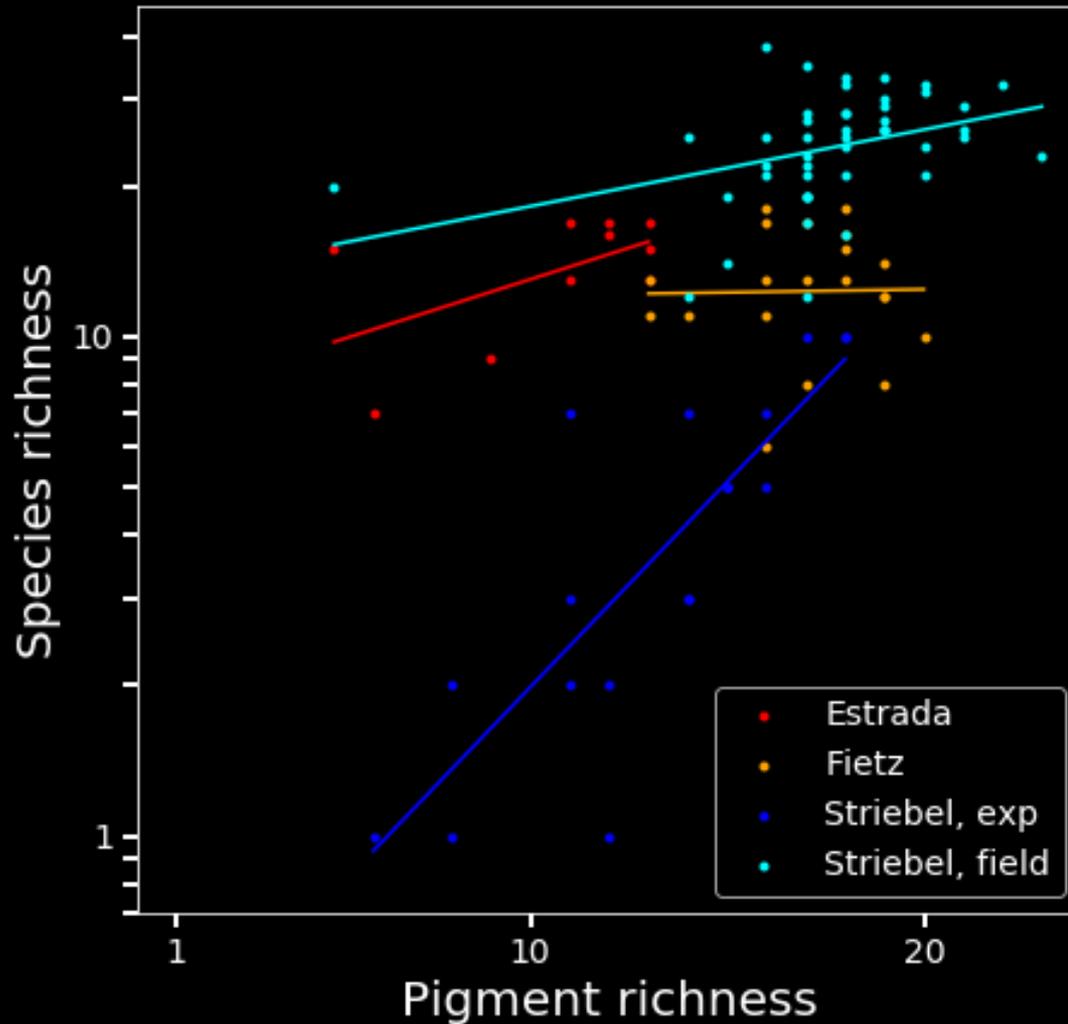
# Species richness saturates with species richness



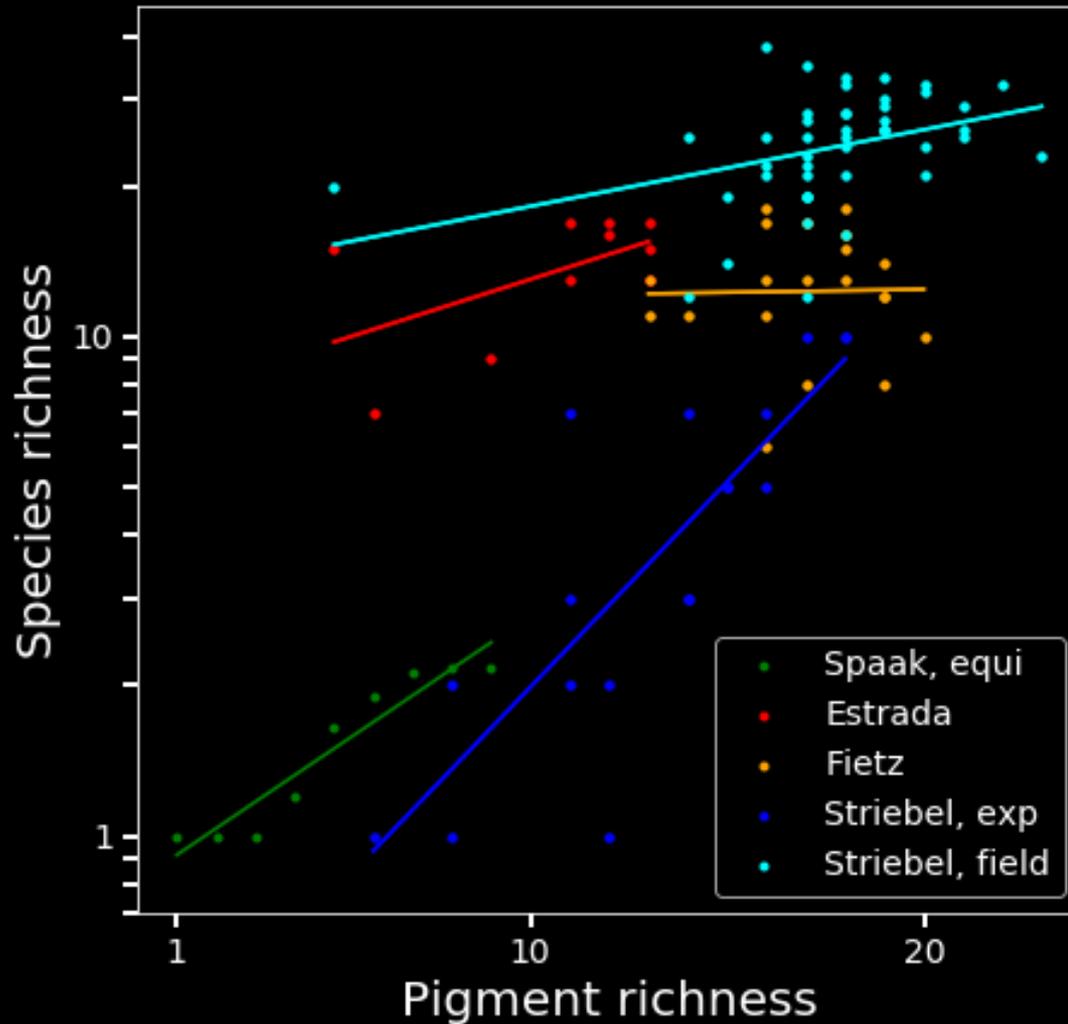
# Many pigments absorb the blue-greenish light spectrum



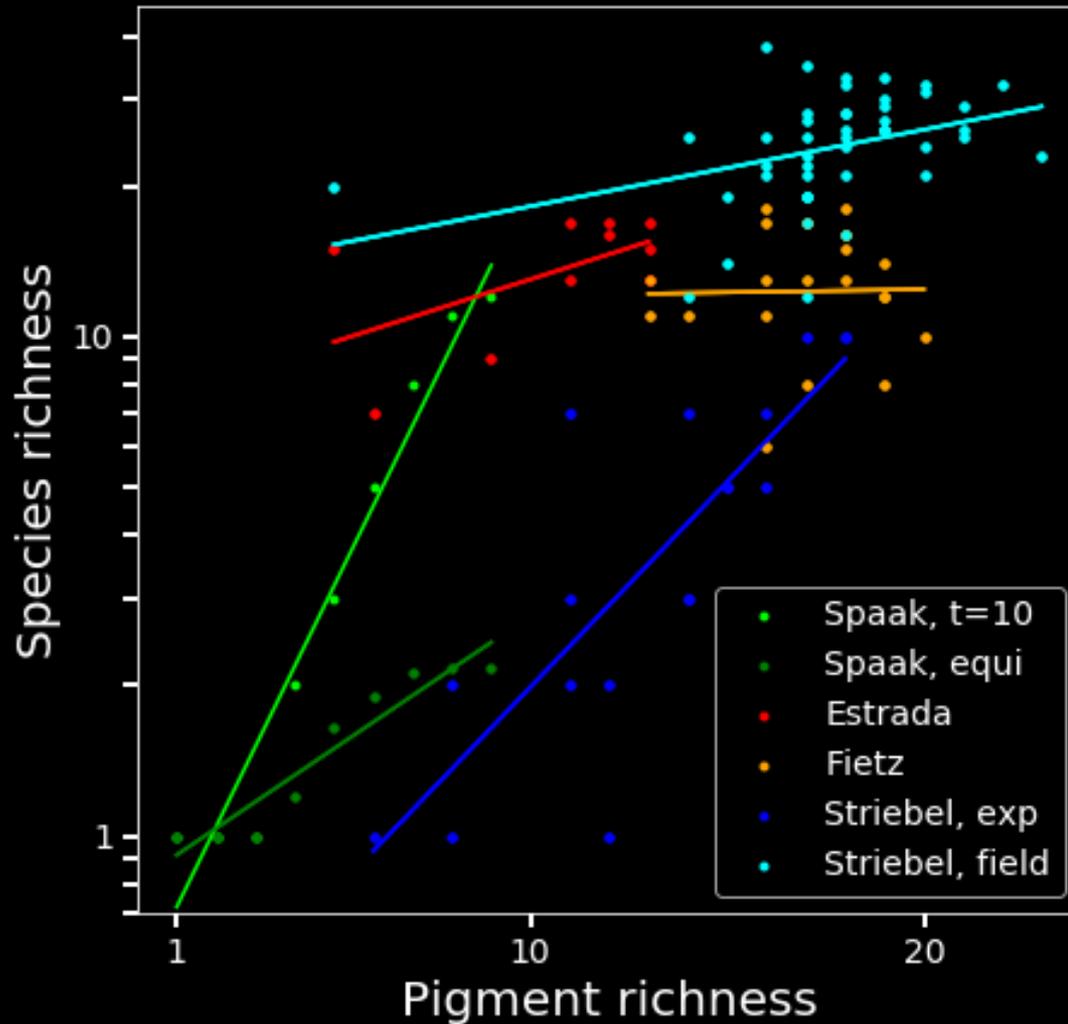
# Species richness decreases over time



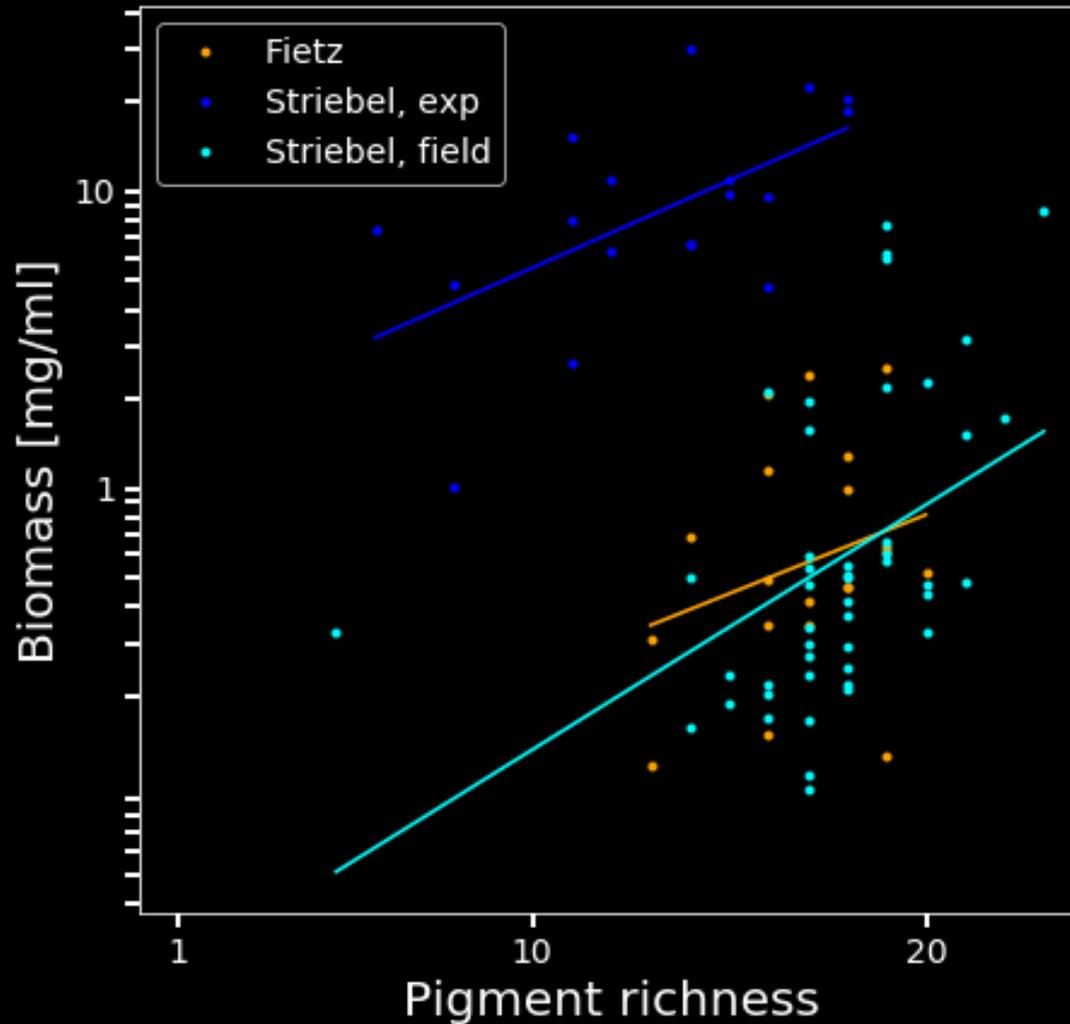
# Species richness decreases over time



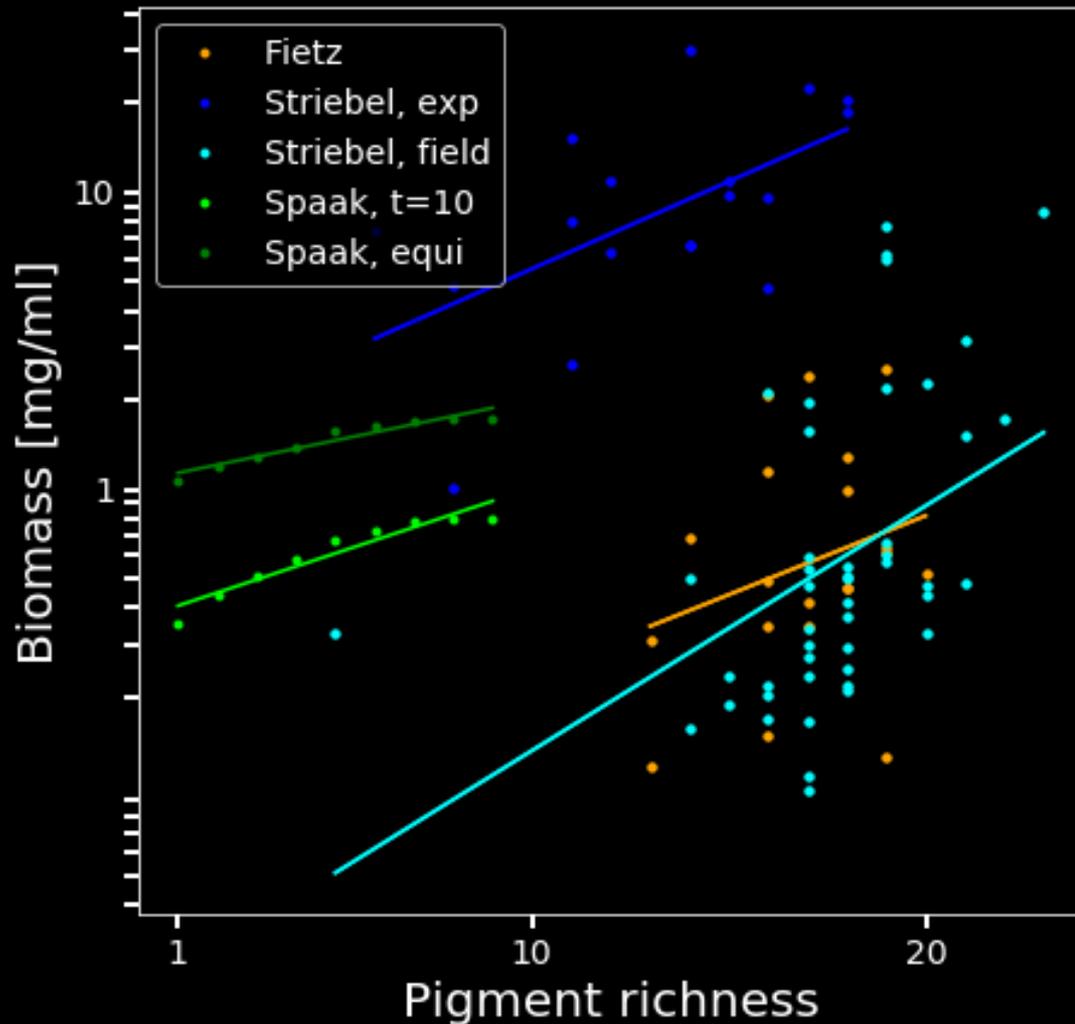
# Species richness decreases over time



# Coexistence requirements reduce ecosystem function



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Pigment richness has limited effects  
on phytoplankton communities, because...

- Real pigments share absorption peaks

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- Phytoplankton share many of their pigments
- This enables only few species to coexist
- Which limits absorption of all wavelength
- Therefore not all energy is converted into ecosystem function

# Questions?

