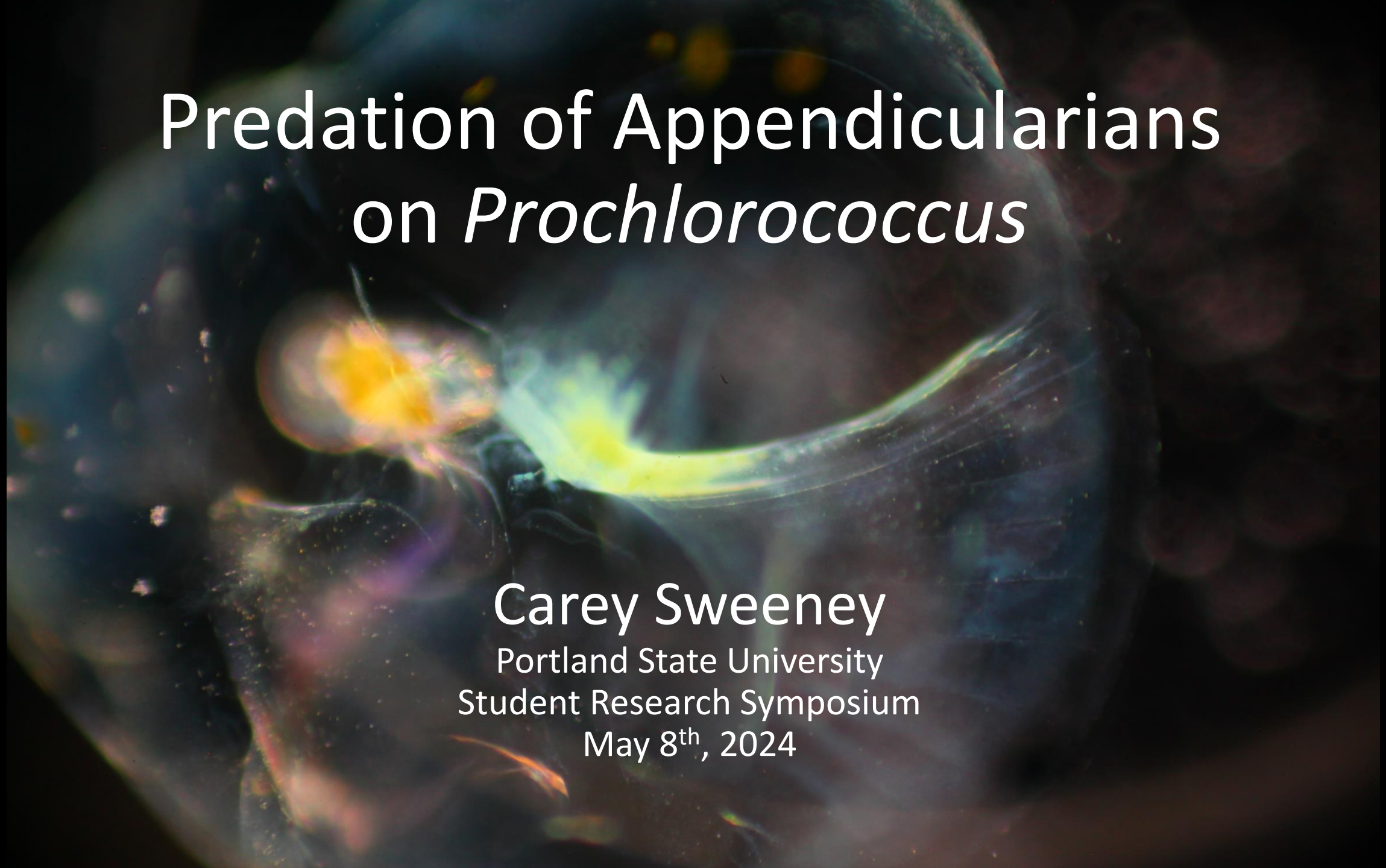
May 8th, 9:00 AM - 11:00 AM

Variability of Grazing by Appendicularians on Prochlorococcus

Carey Sweeney
Portland State University

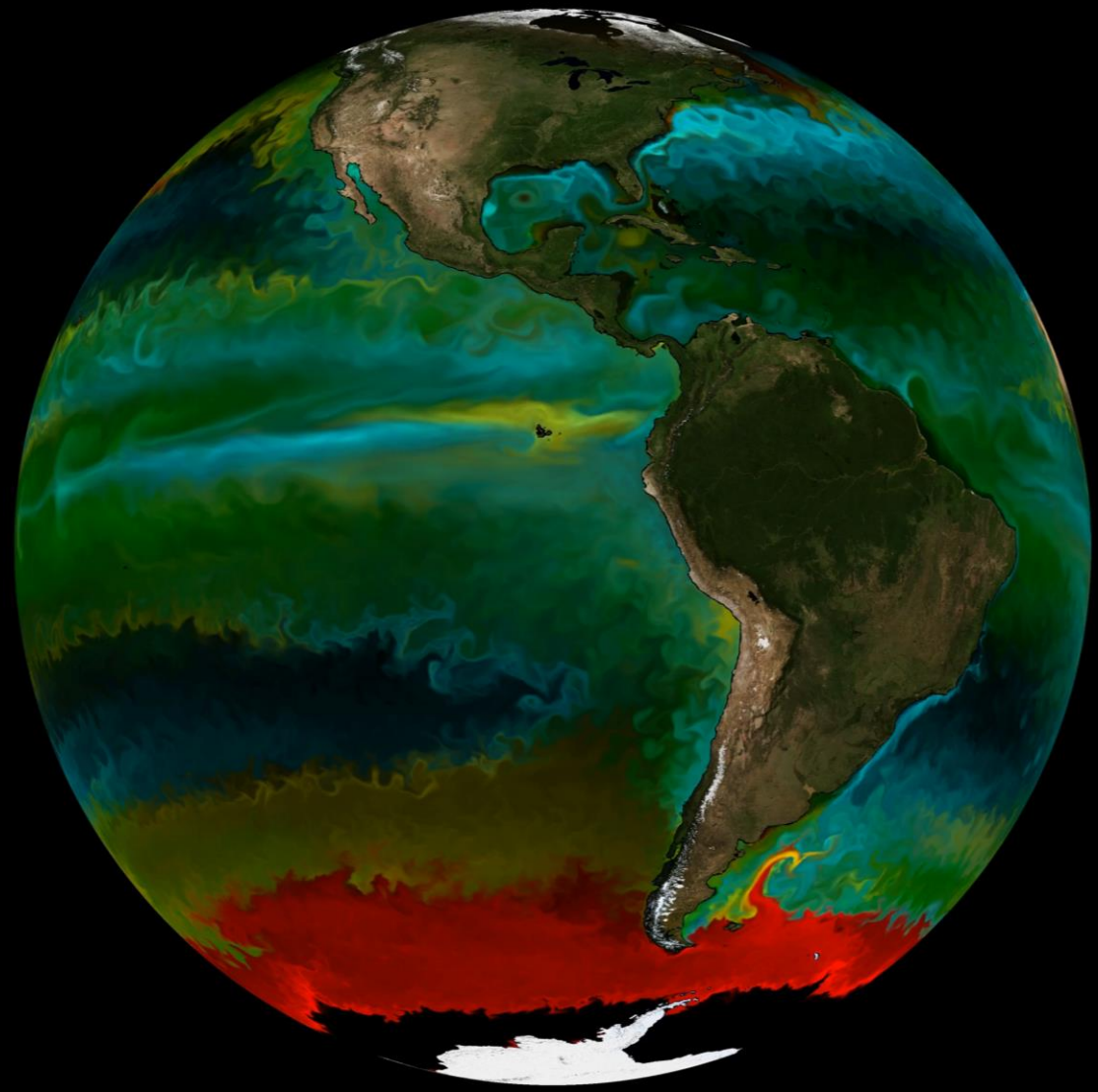


Predation of Appendicularians on *Prochlorococcus*

Carey Sweeney
Portland State University
Student Research Symposium
May 8th, 2024

Prochlorococcus

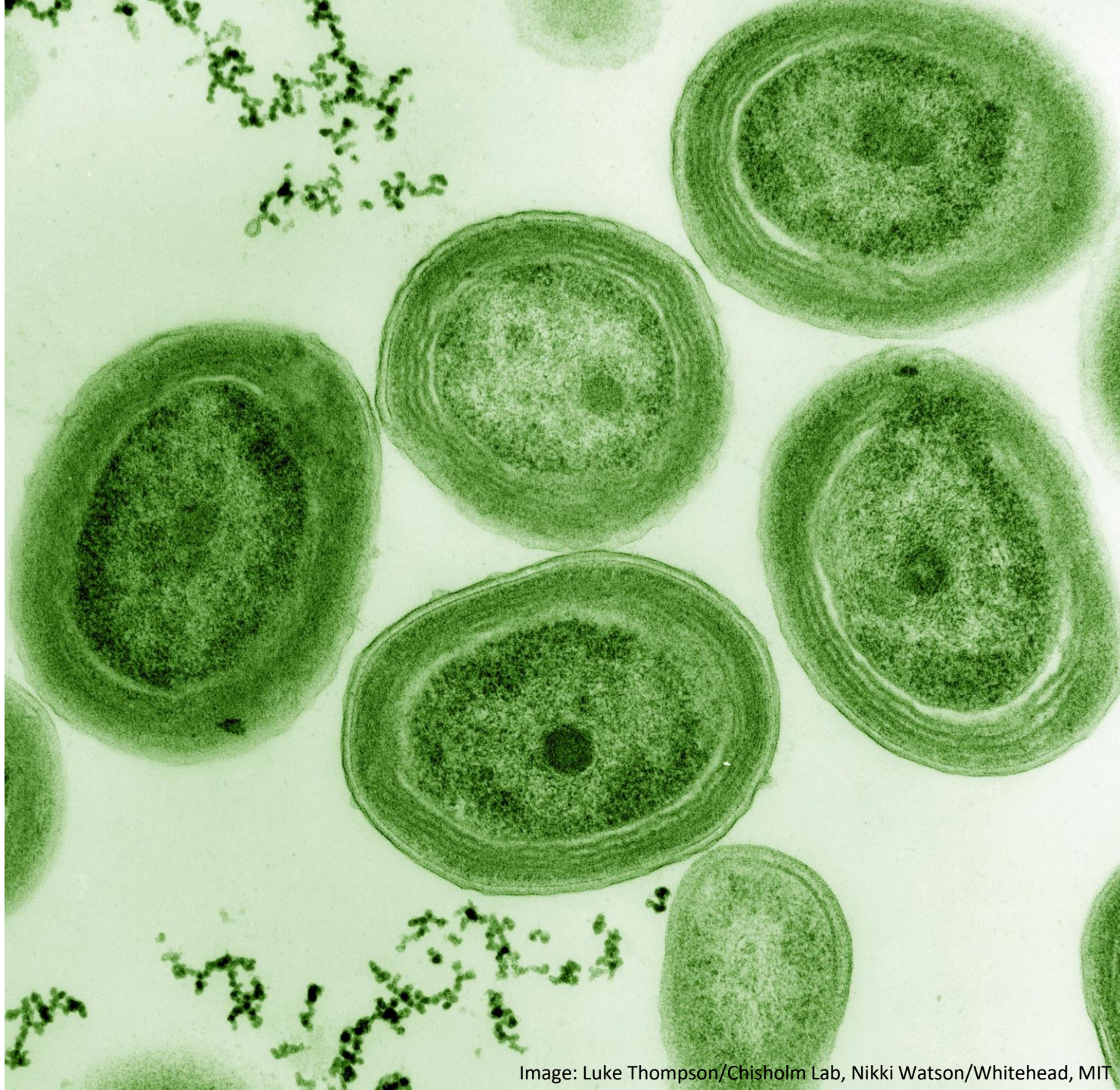
The most abundant photosynthetic cell on Earth



MIT Darwin Project

Prochlorococcus

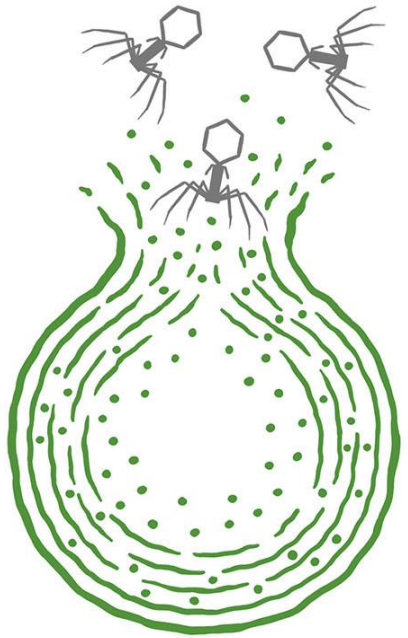
- Growth well-studied
- Loss NOT well-studied



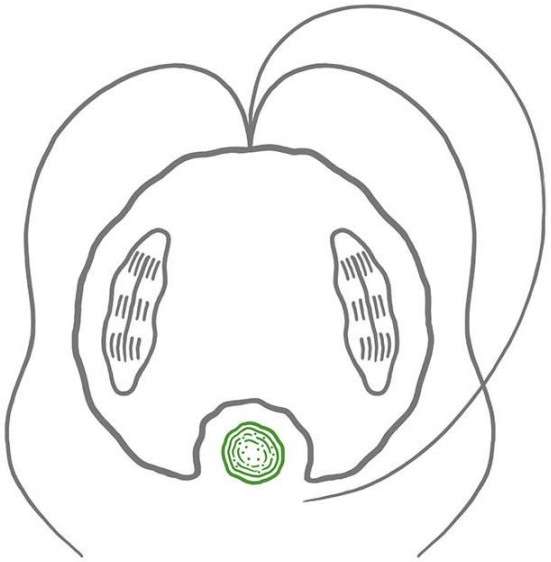
(Biller, et.al., 2014, Flombaum 2013)

Image: Luke Thompson/Chisholm Lab, Nikki Watson/Whitehead, MIT

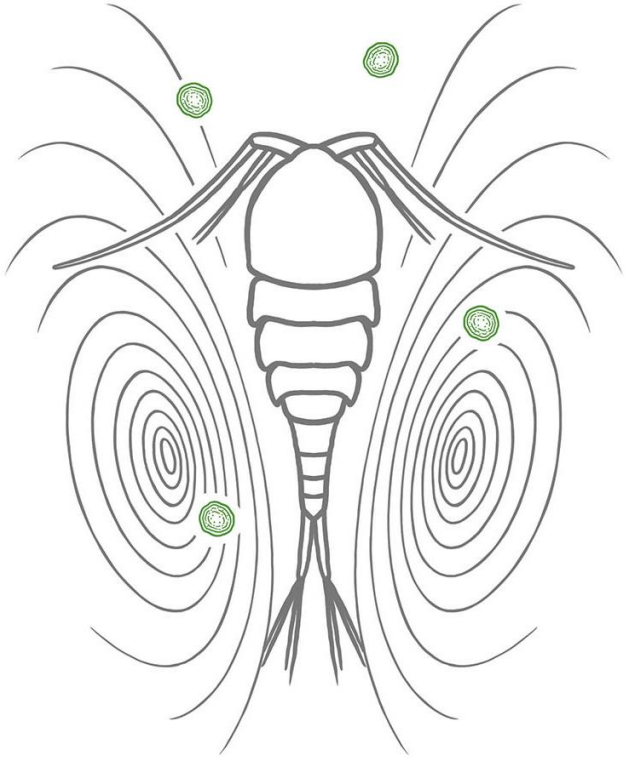
How Does *Prochlorococcus* die?



Viruses



Protists



Small Crustaceans

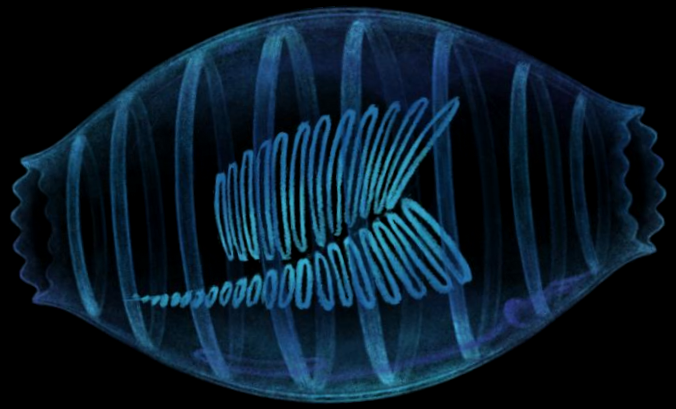
?

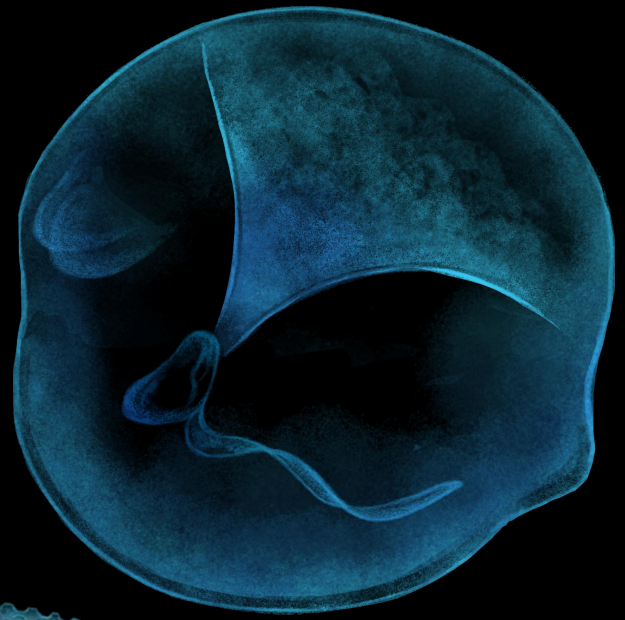
Who else?

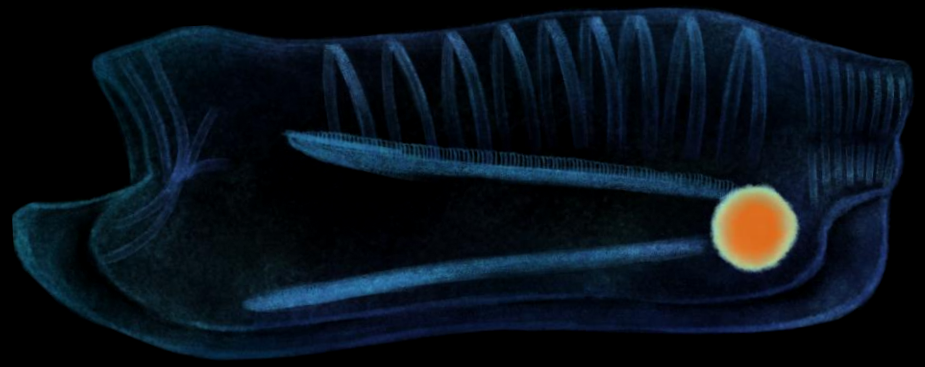
Sullivan, et.al., 2003, Wilken, et.al., 2023, Li, et.al., 2022, Frias-Lopez, et.al., 2009

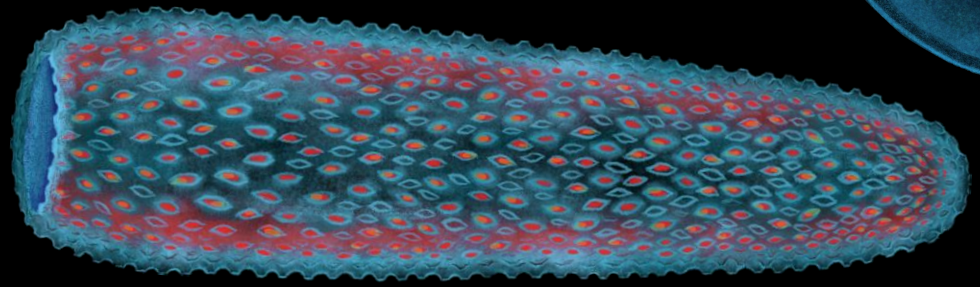
Images: Thompson

Gelatinous Grazers







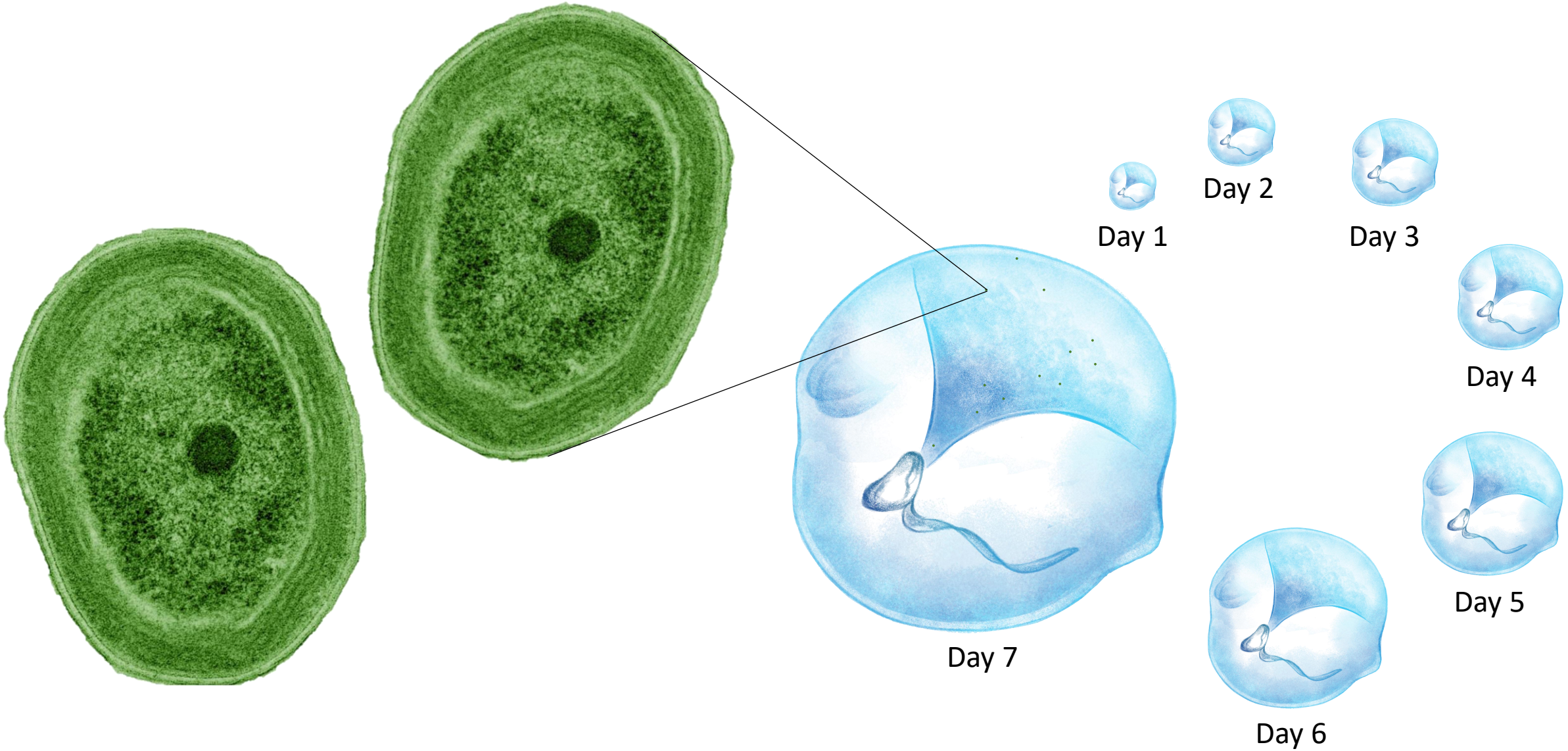


Images: Franz Anthony, Anne Thompson

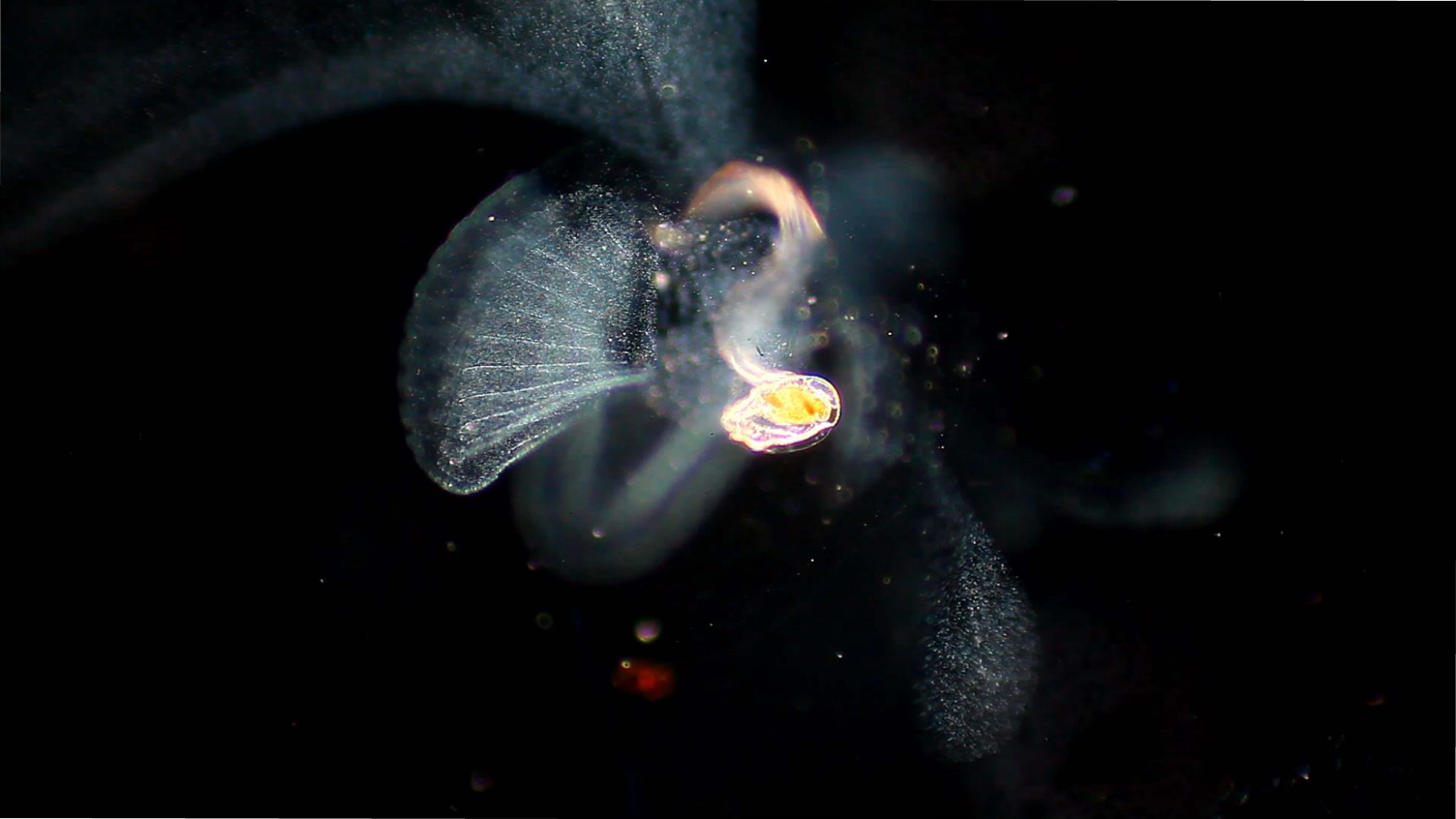
Appendicularians

- Ubiquitous
- External mucous mesh
- Discarded houses
- Short life cycles
- Dynamic nutritional demand
- Bloom events

Images: Franz Anthony, Anne Thompson



Appendicularian: Franz Anthony, Anne Thompson, *Prochlorococcus*: Luke Thompson/Chisholm Lab, Nikki Watson/Whitehead, MIT



Research Questions

1. Does the concentration of *Prochlorococcus* that's available impact grazing rates of appendicularians?

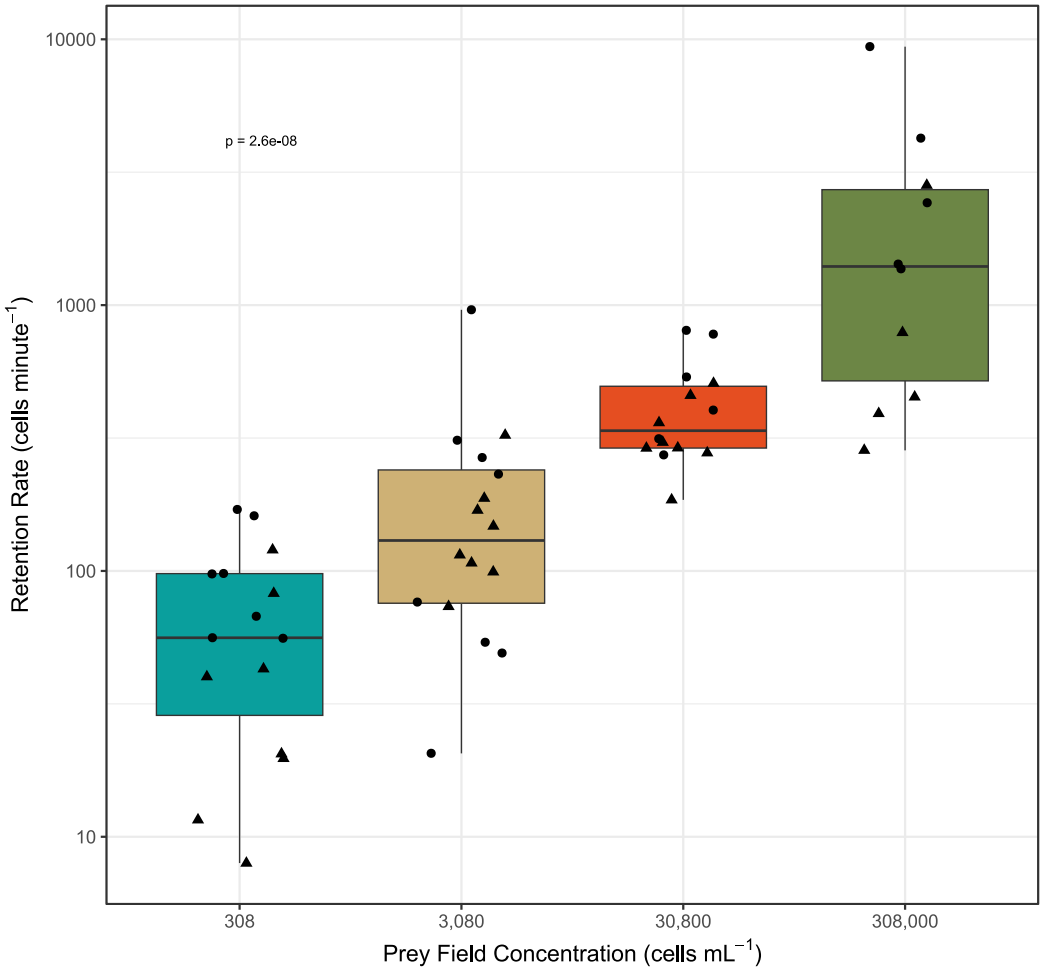
2. Are appendicularian grazing rates different their different life stages?

Methods
Appendicularian Incubations

- Lab-cultivated *Oikopleura dioica*
- Prey fields of *Prochlorococcus* MED4
- DNA Extractions (ZymoBIOMICS)
- MED4 *Prochlorococcus* with qPCR
- Data analysis and visualization with R

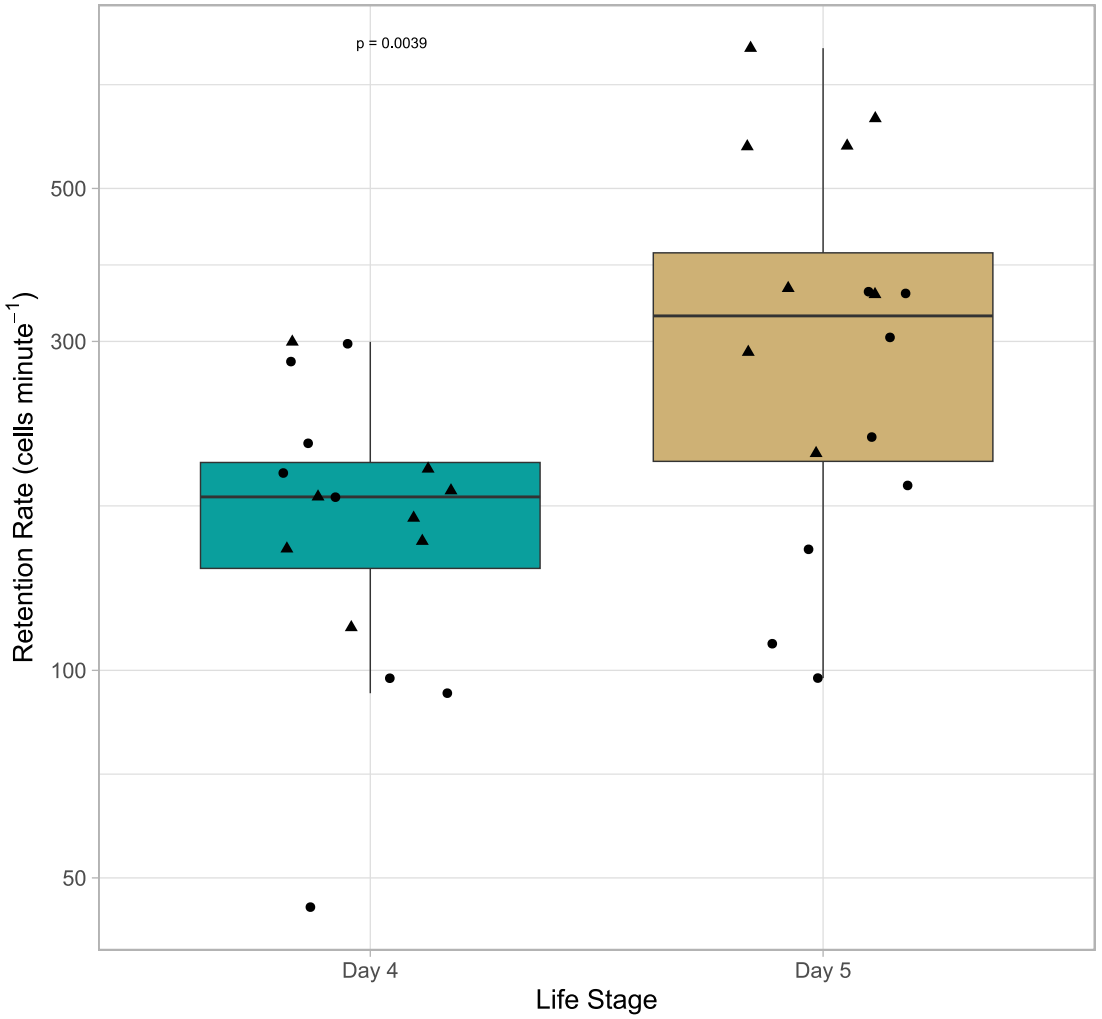
With Anne Aasjord and Daniel Chourrout at Michael Sars Centre

Does the concentration of *Prochlorococcus* that's available impact grazing rates of appendicularians?



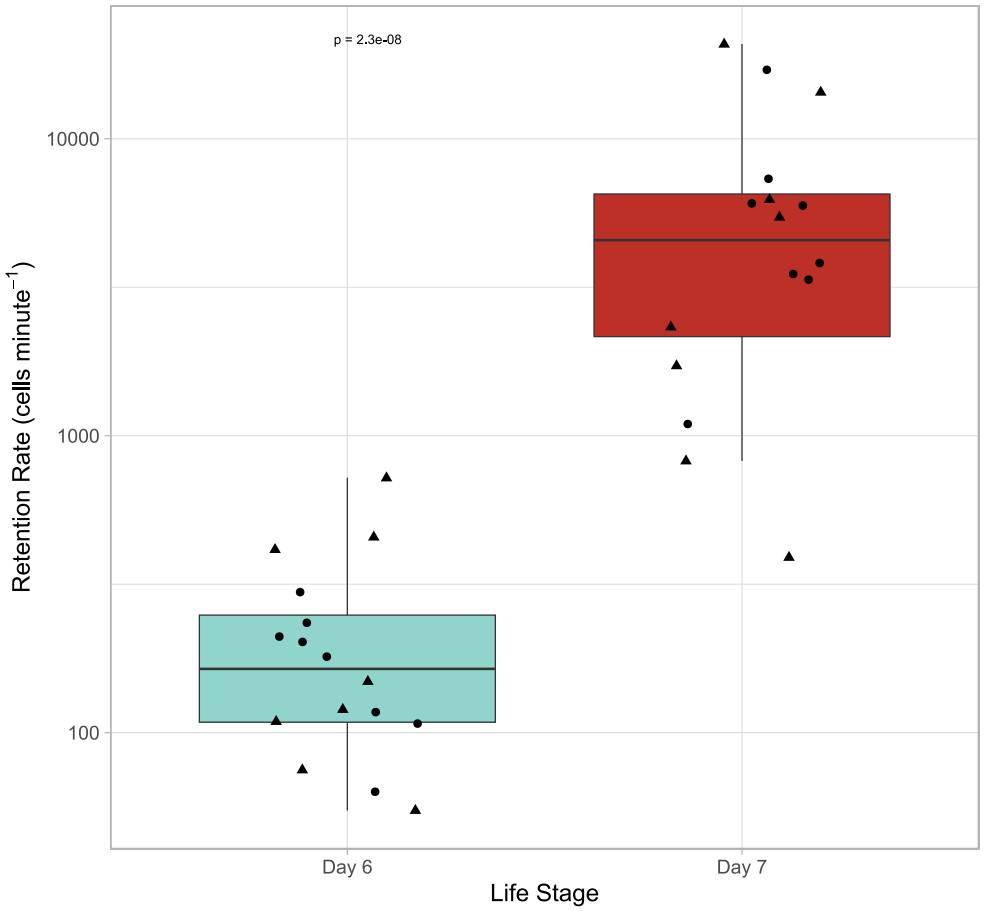
- Retain more cells in higher concentrations
- No sign of a maximum retention limit
- Determined numerical relationship
- Ready for model input

Are appendicularian grazing rates different their different life stages?



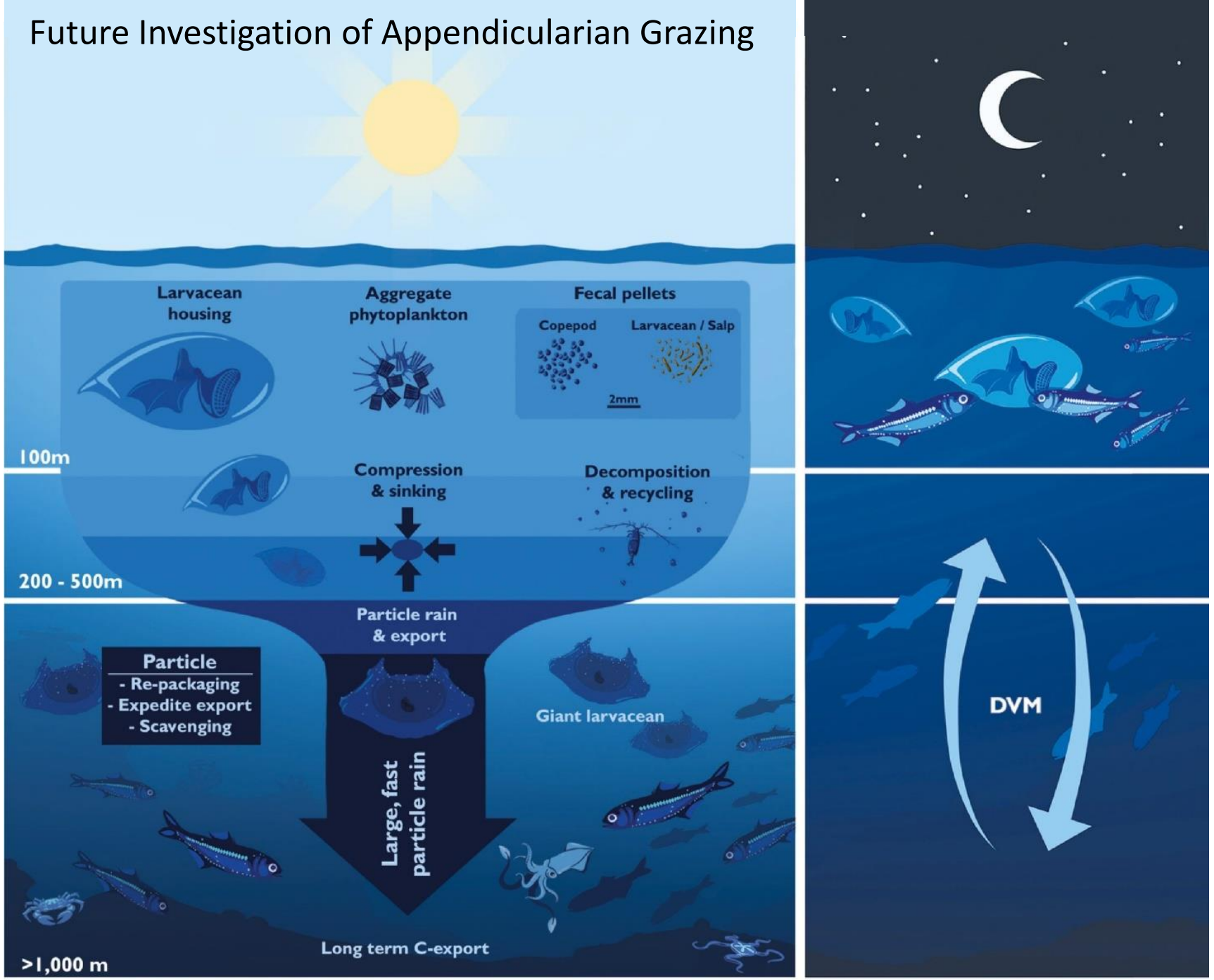
- Difference in grazing between D4 and D5 life stages

Are appendicularian grazing rates different their different life stages?

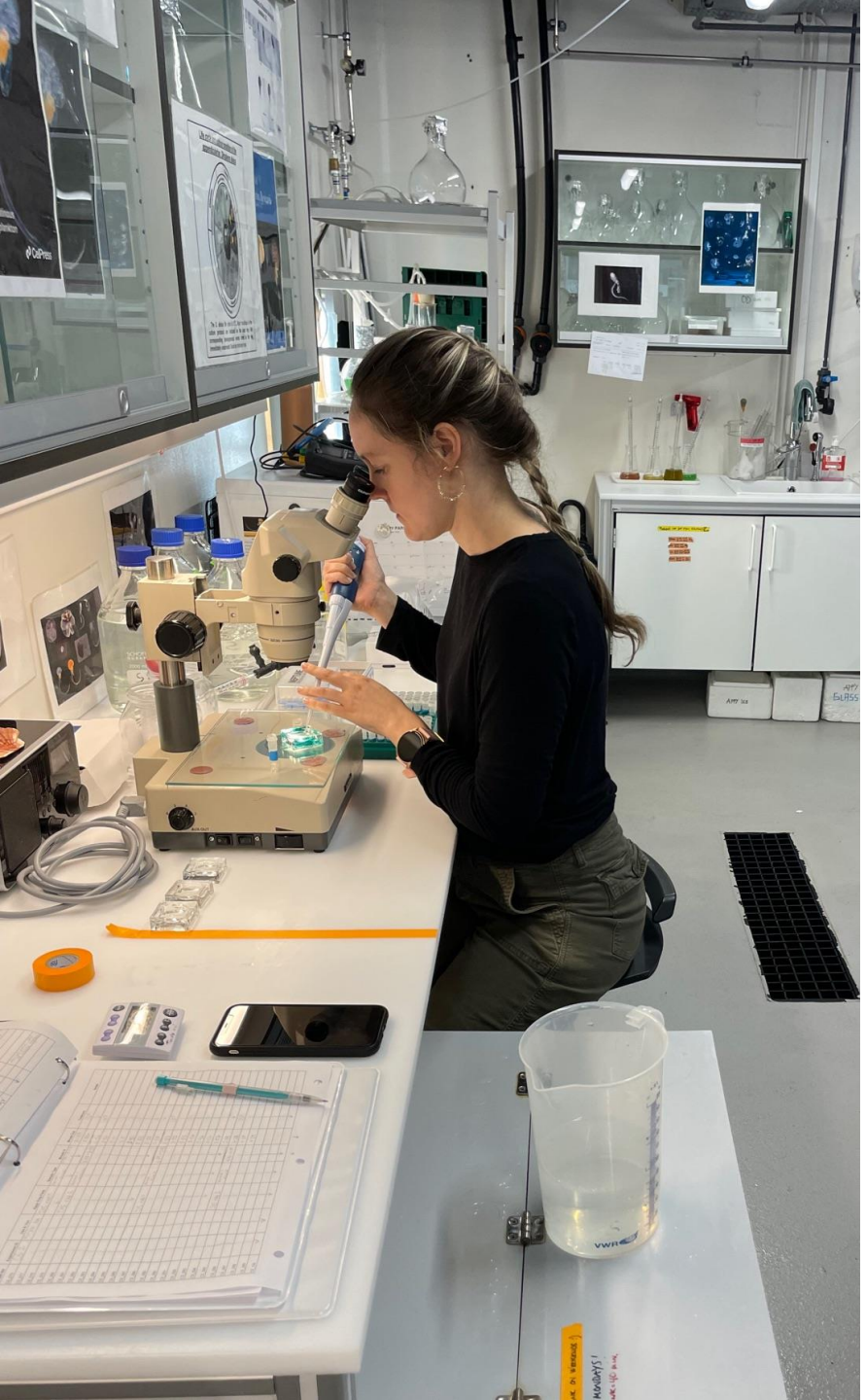


- Difference in grazing between D6 and D7 life stages
- Final life stage (D7) has a marked increase in grazing

Future Investigation of Appendicularian Grazing



Jaspers, et.al., *Trends in Ecology & Evolution,* 2023



Acknowledgements

Anne Thompson
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Terra Heibert
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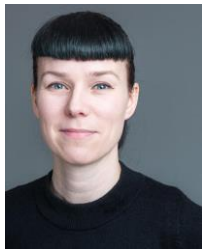

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