The Impact of Climate Change on Sea Hare Respiration

Nuances of survival in a changing environment

By Dr. Desiree Forsythe &
Dr. Richelle Tanner

Today's Learning Objectives

Content learning objective(s)

1. Create connections between how changing (via increasing/decreasing) one species population impacts other species within the same environment.
2. Describe how the impacts of climate change vary depending on the organism in question.

Quantitative learning objective(s)

3. Interpret graphs and/or data figures related to the concepts from this lesson
4. Describe the purpose of error bars
5. Reflect on your perceptions about using graphs or figures in biology.

Diversity/equity/inclusion learning objective(s)

6. Reflect on how climate change impacts people from marginalized groups disproportionately.
7. Reflect on your perceptions of people who do biology.
8. Compare your own interests and/or identities to those of people who do biology.

Discussion Question 1!

Turn to a person next to you and discuss:

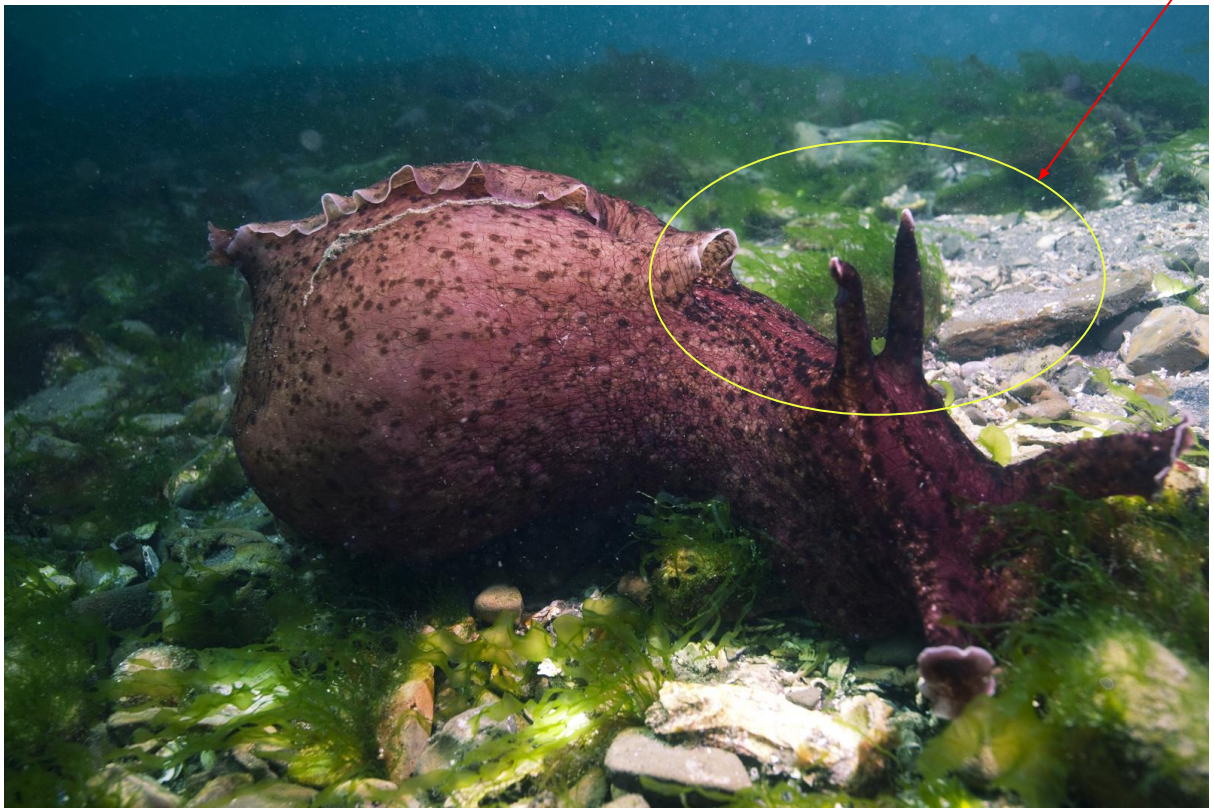
- When you hear the phrase climate change, what do you think of?
- What imagery do you see?

What is a Sea Hare?

What is a Sea Hare?

- Sea snail
- Various sizes!
- Feed on seaweed (which may give them their color!)
- An individual can act as both male and female
- **How do you think sea hare's got their name?**

What is a Sea Hare?



Rhinopores!

- Sea snail
- Various sizes
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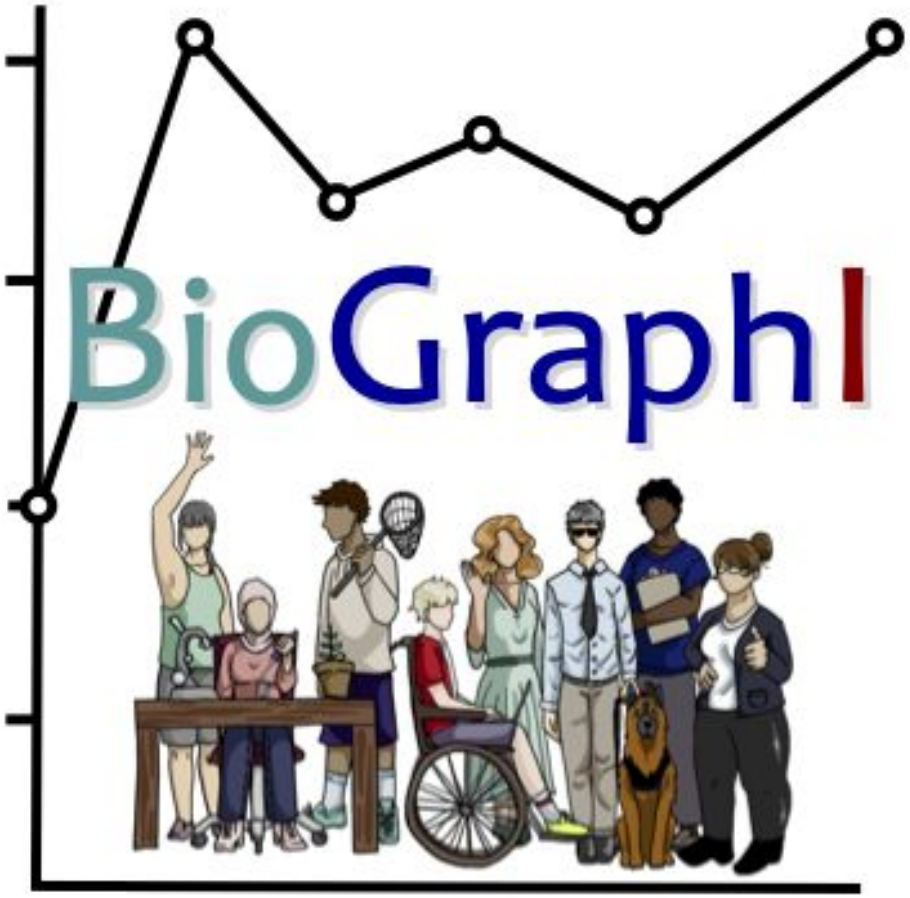
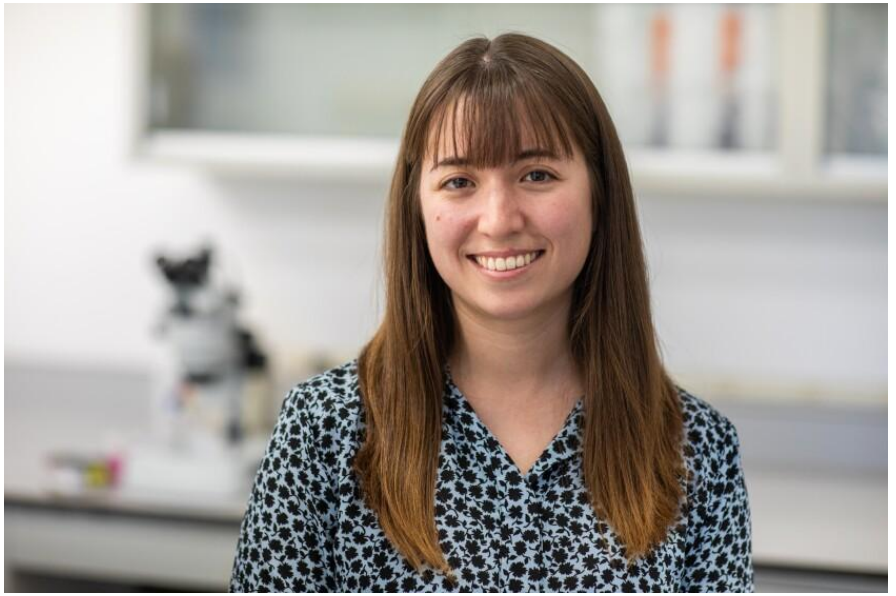


Interview with
Dr. Richelle Tanner



Meet Dr. Richelle Tanner!

- Dr. Tanner studies sea slugs and climate change.
- Let’s welcome Dr. Tanner and hear her approach to research.

Discussion Question 2!

Turn to a person next to you and discuss:

- Can you define salinity?
- What do you think “ocean acidification” means?

Ocean acidification and Salinity

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Why Sea Hares?!

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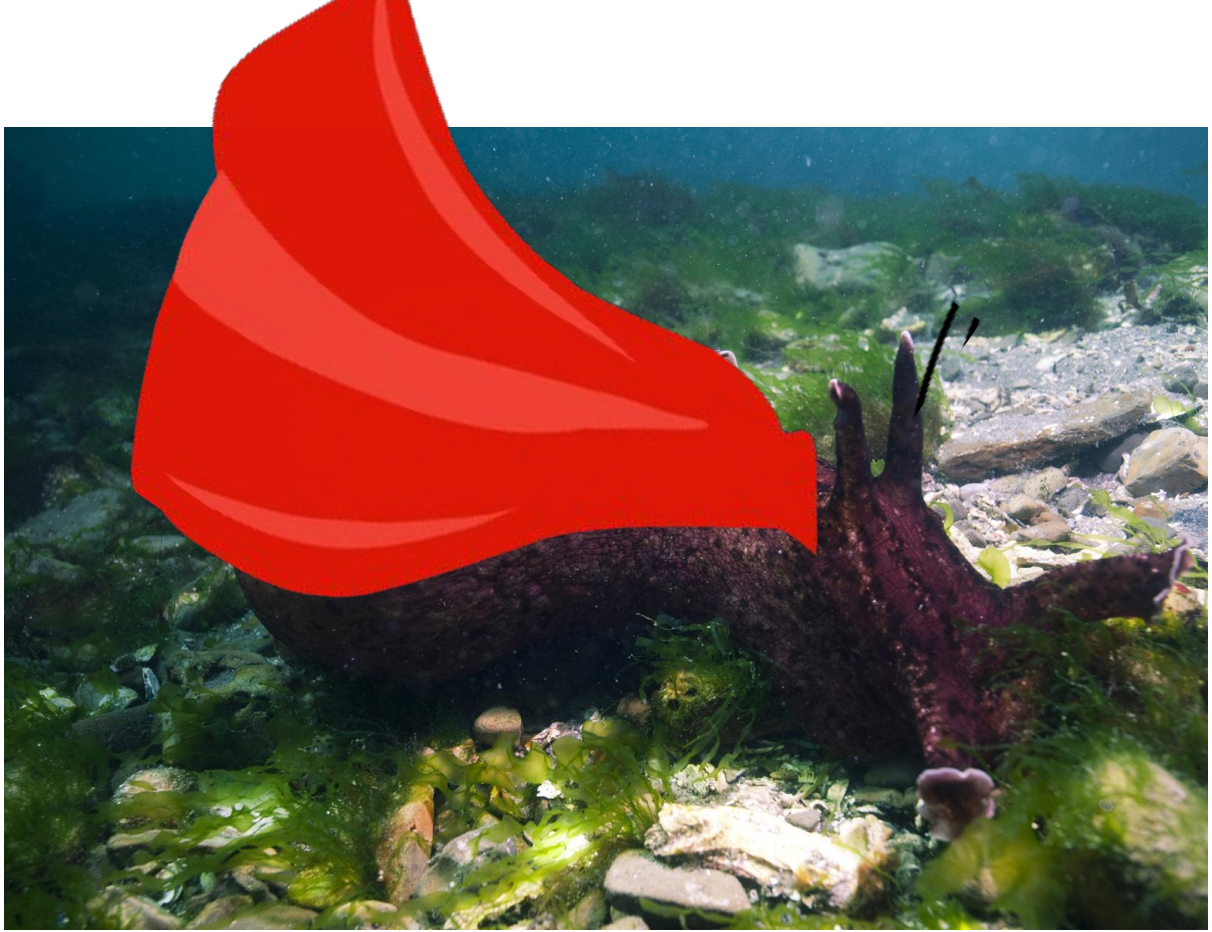
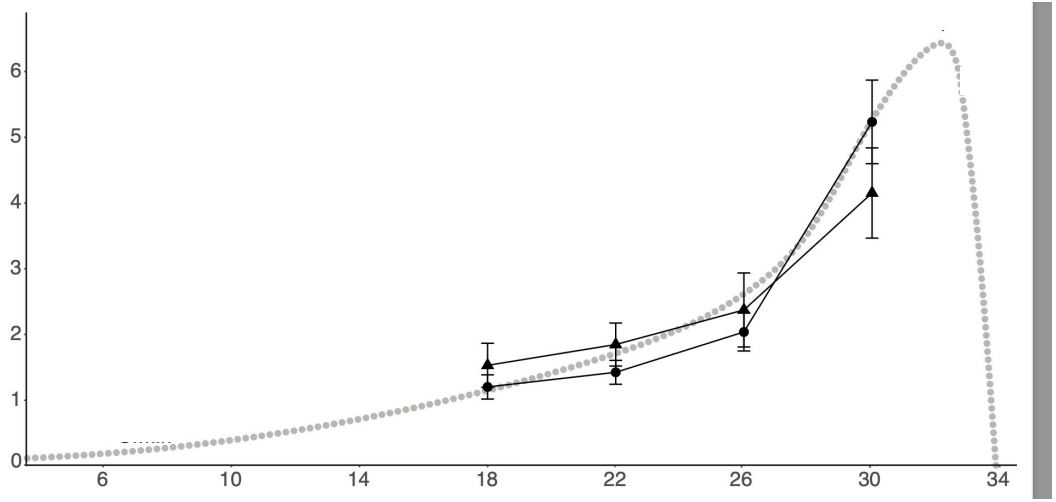


Sea hares =
super heros

Discussion Question 3!
Introducing: Mystery Graph!



With someone next to you, discuss this mystery graph!

- Describe the <u>trend</u> of the data.
- What ecological phenomenon could be graphed here? What do you think these data represent?
- Be ready to share your ideas in 3 minutes.

Let’s hear from Dr. Tanner…

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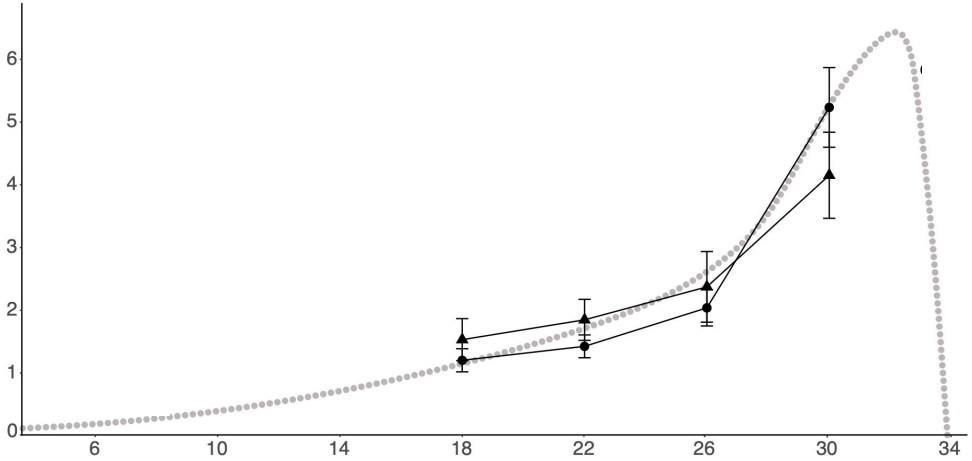
That was a lot of terms! Lets review…

Environmental Temperature:



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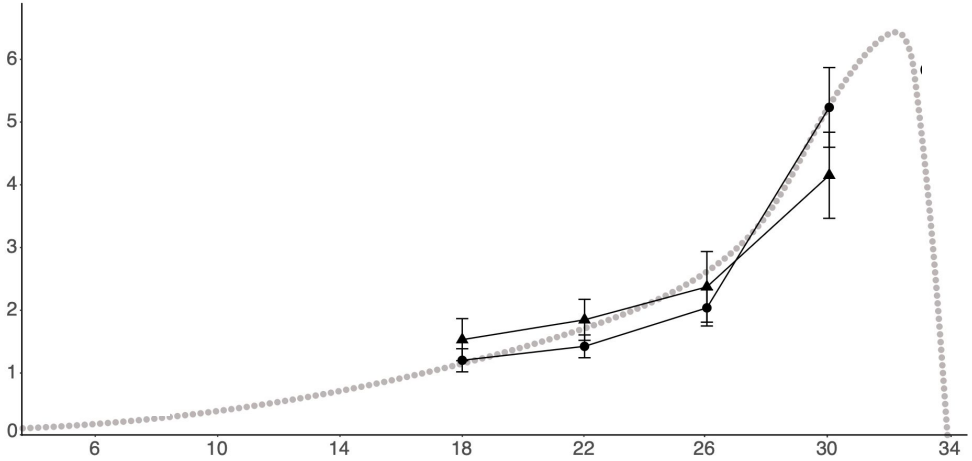
Environmental Temperature:

Refers to the temperature that respiration rate has been measured at



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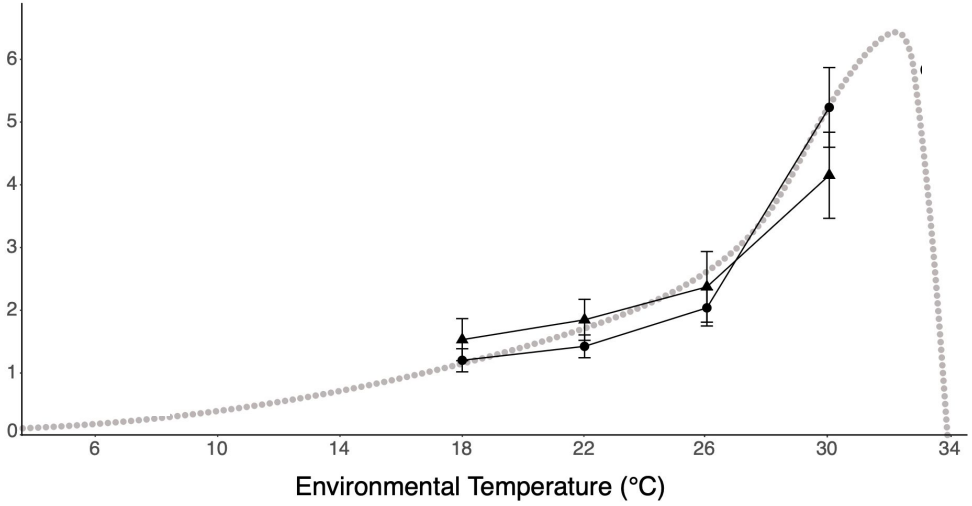

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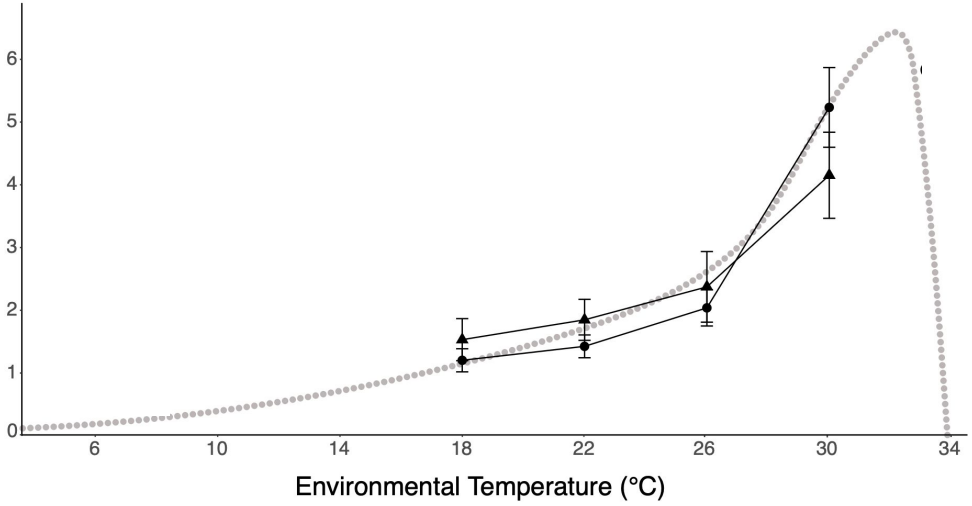

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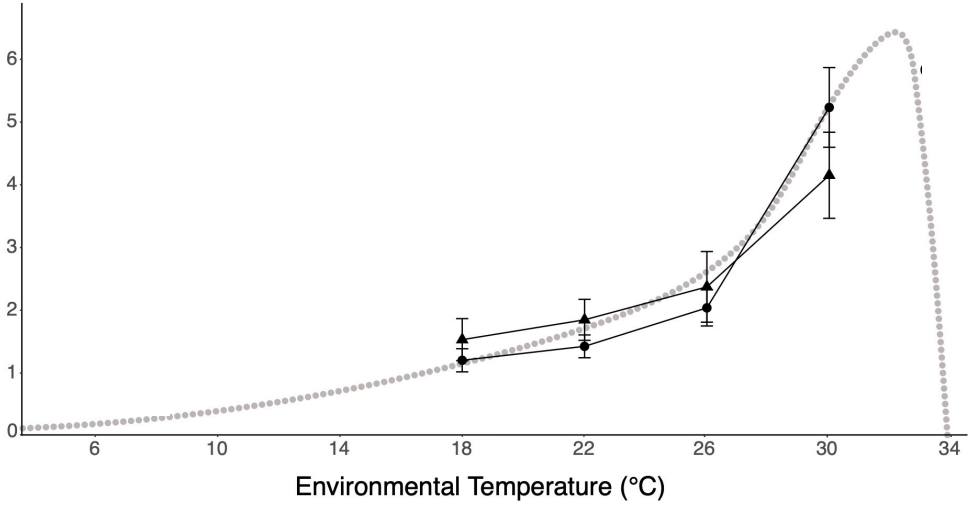
Respiration Rate:

how quickly the sea hare breathes / how much oxygen they consume in a time period



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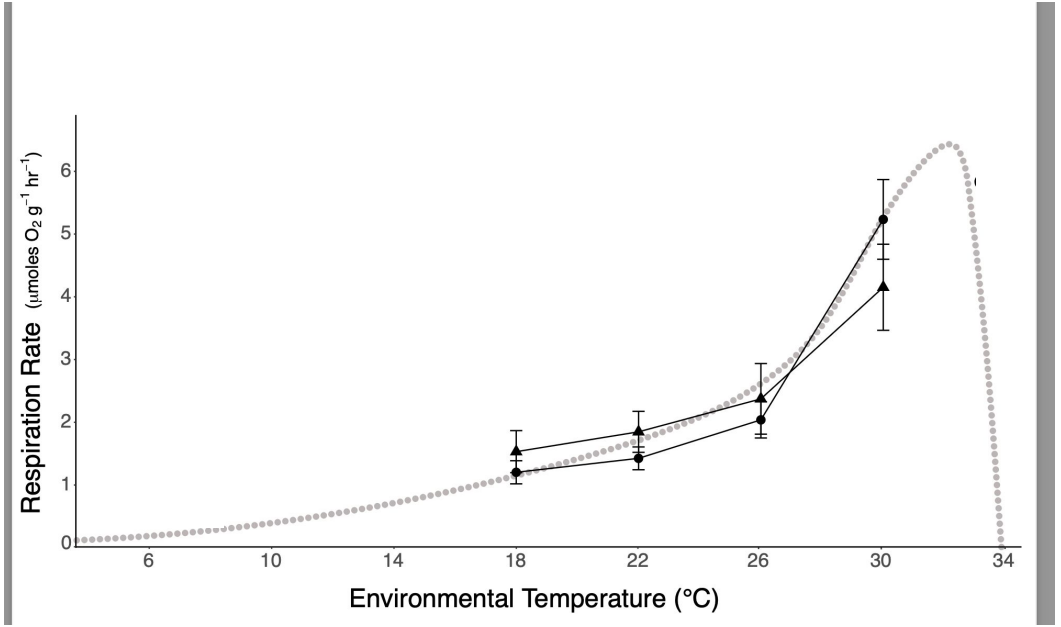

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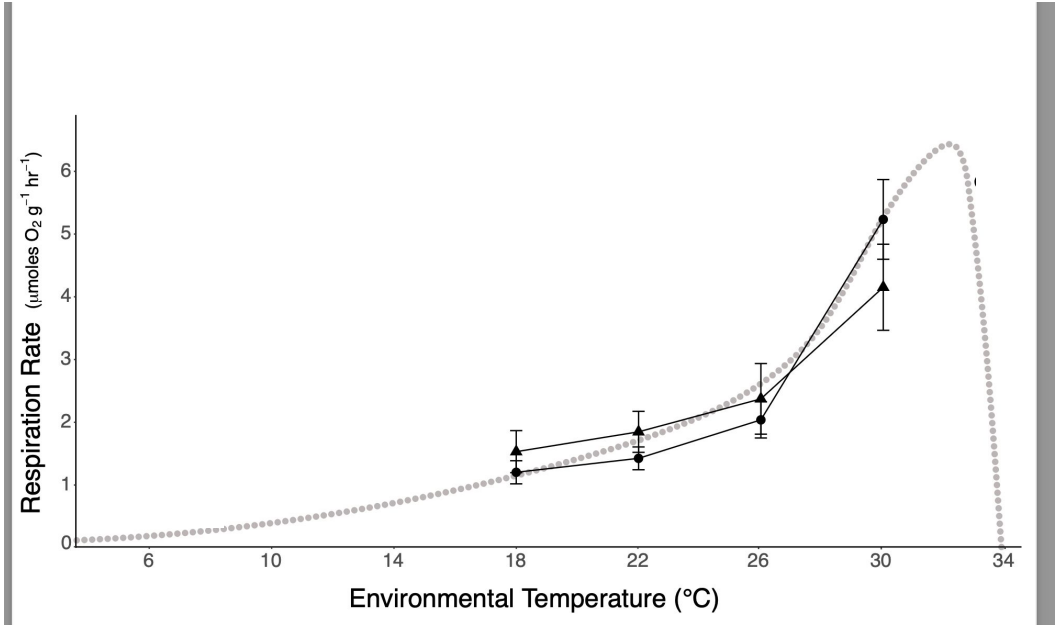

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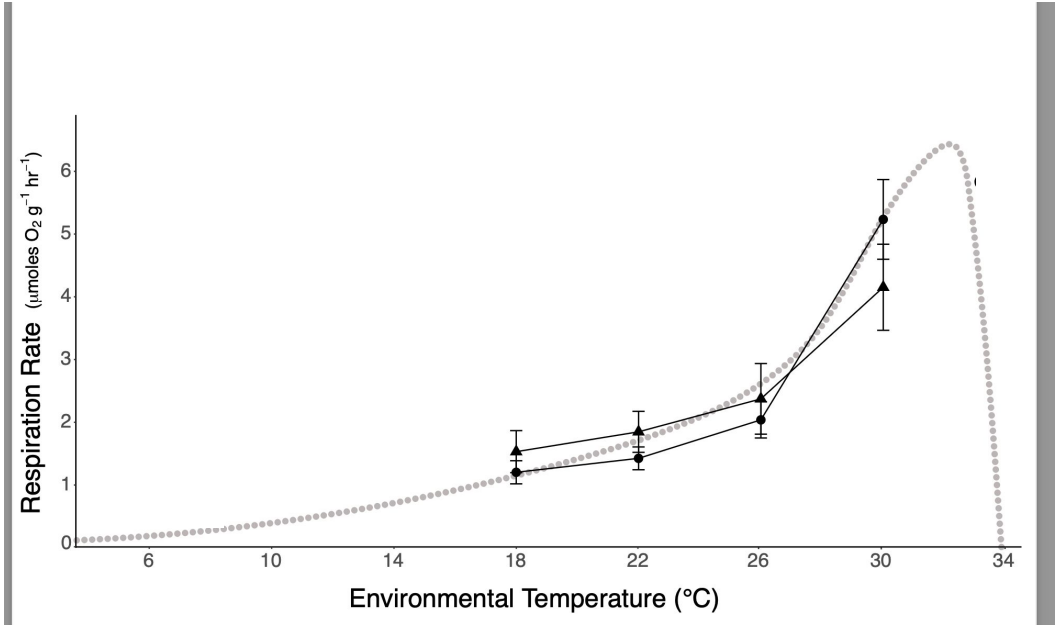

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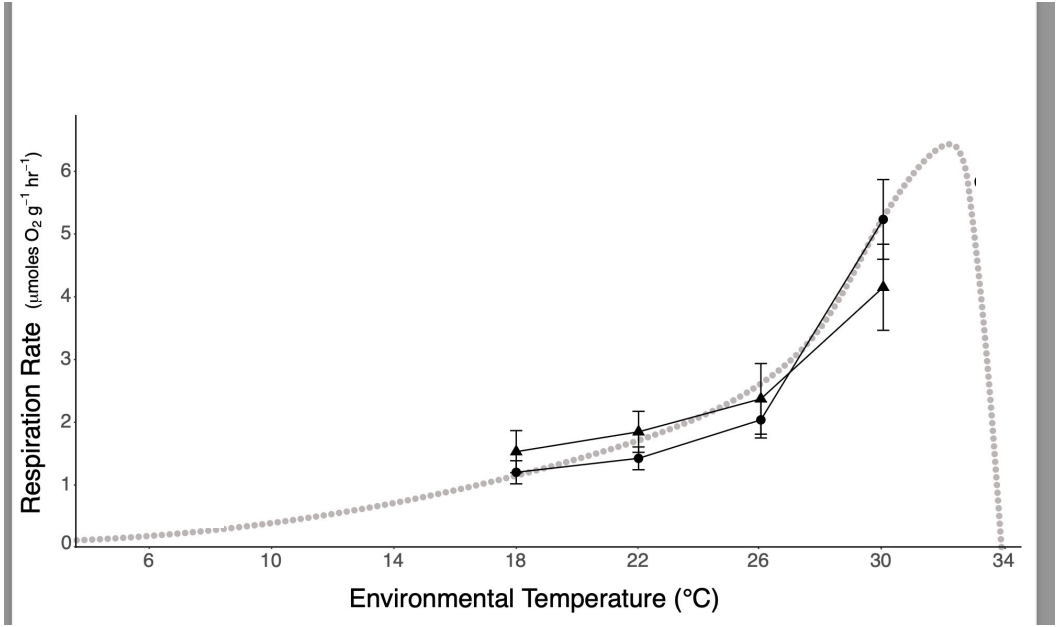

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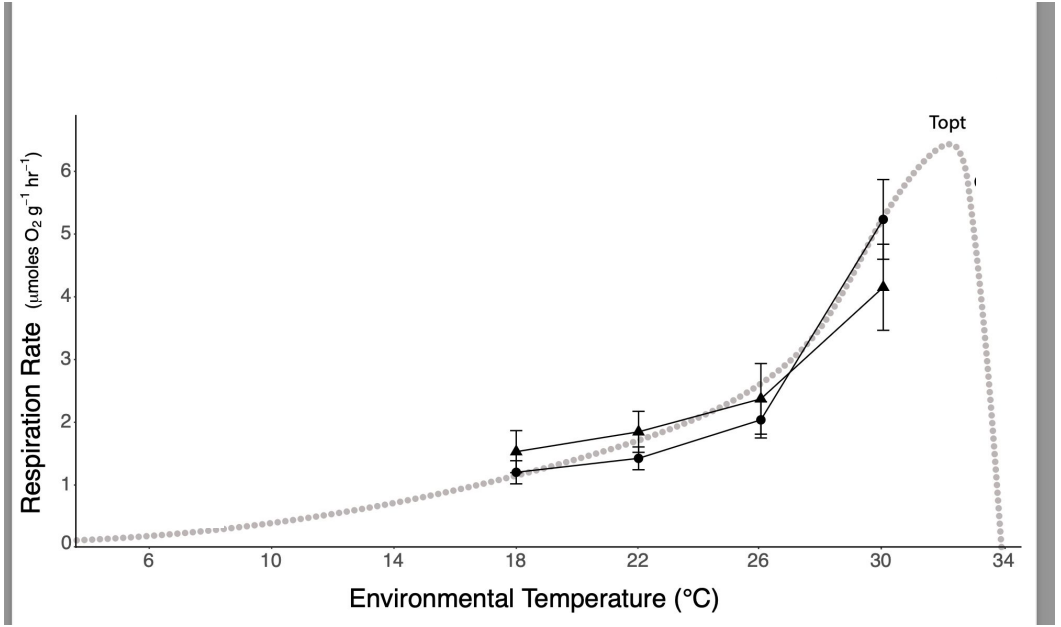

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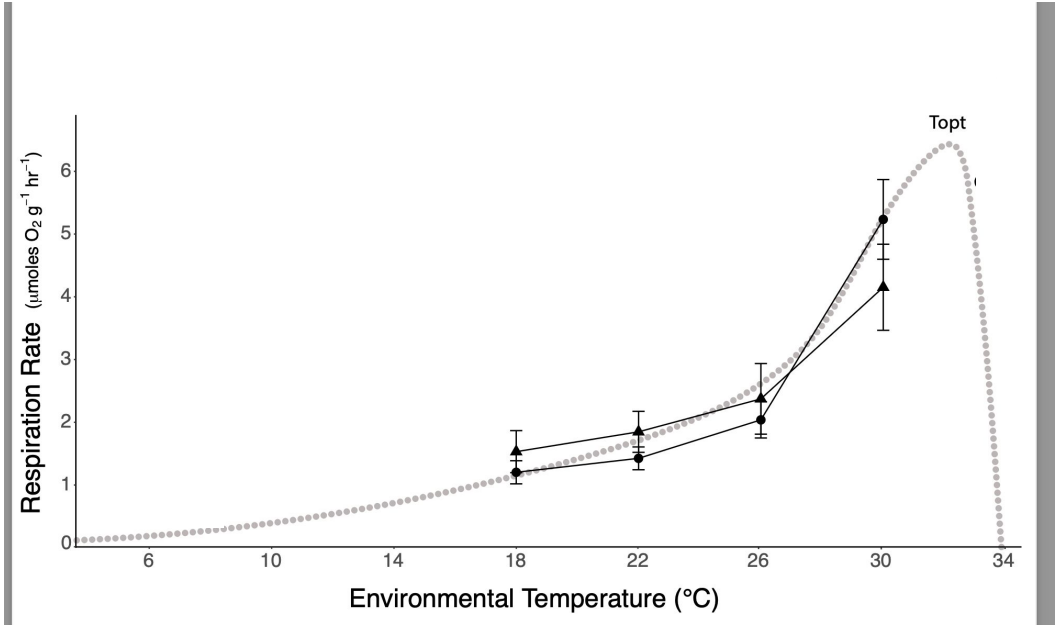

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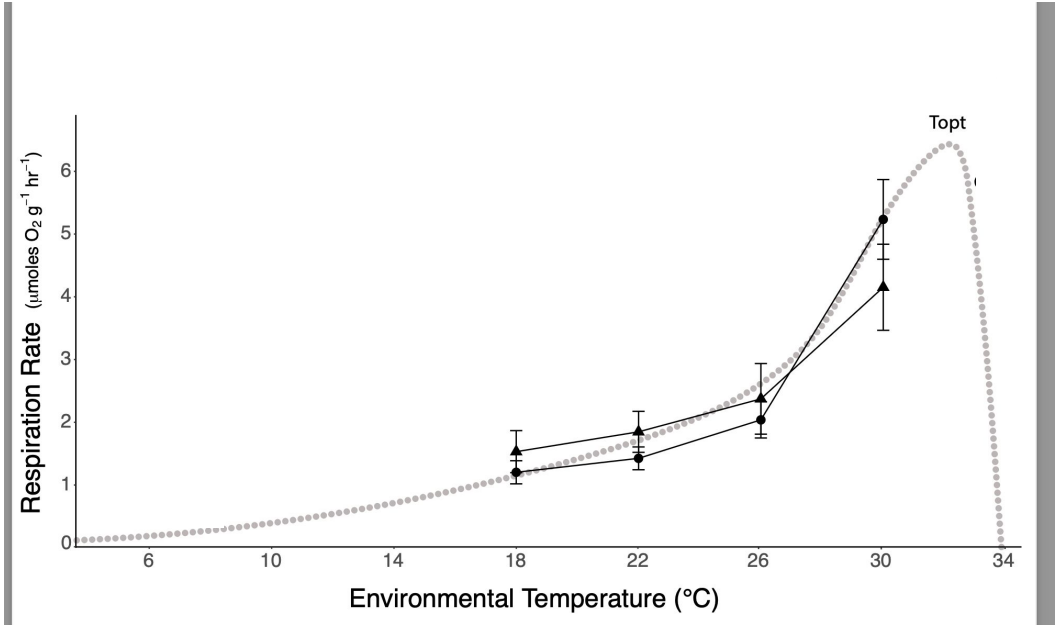

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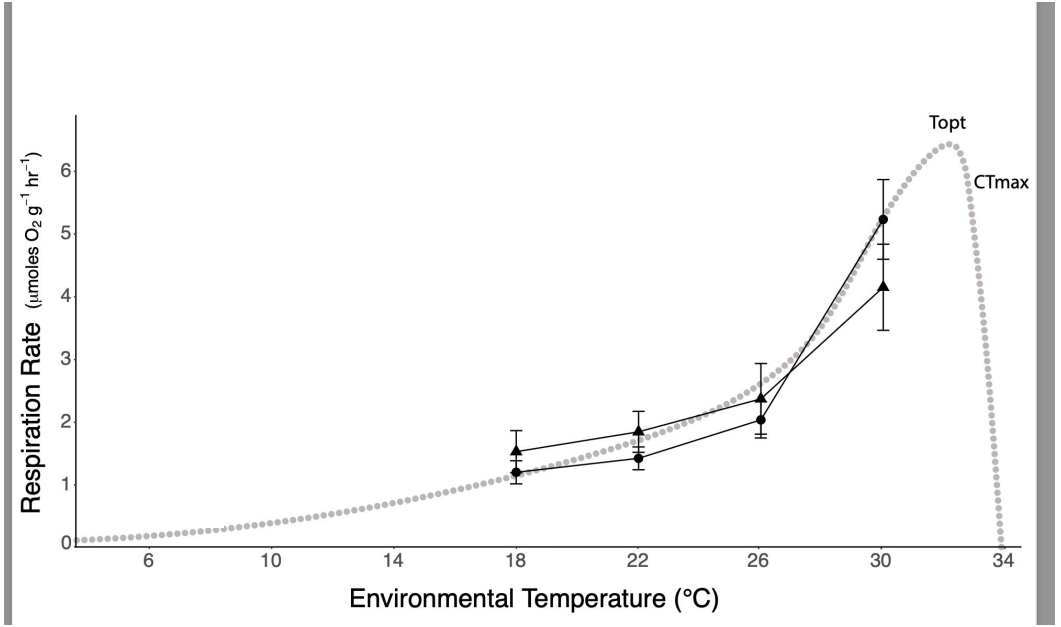

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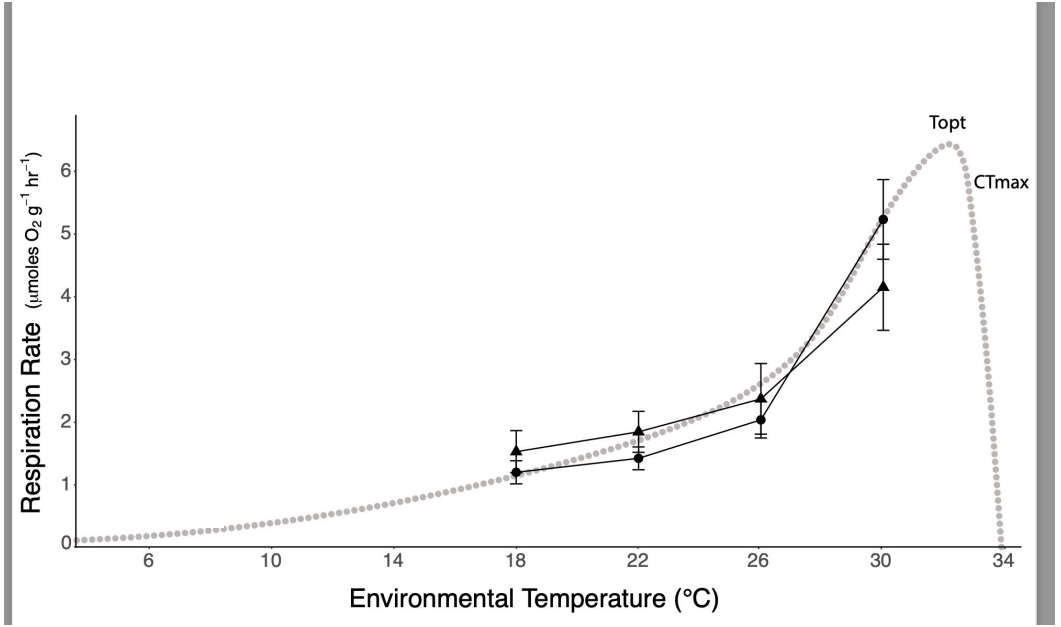

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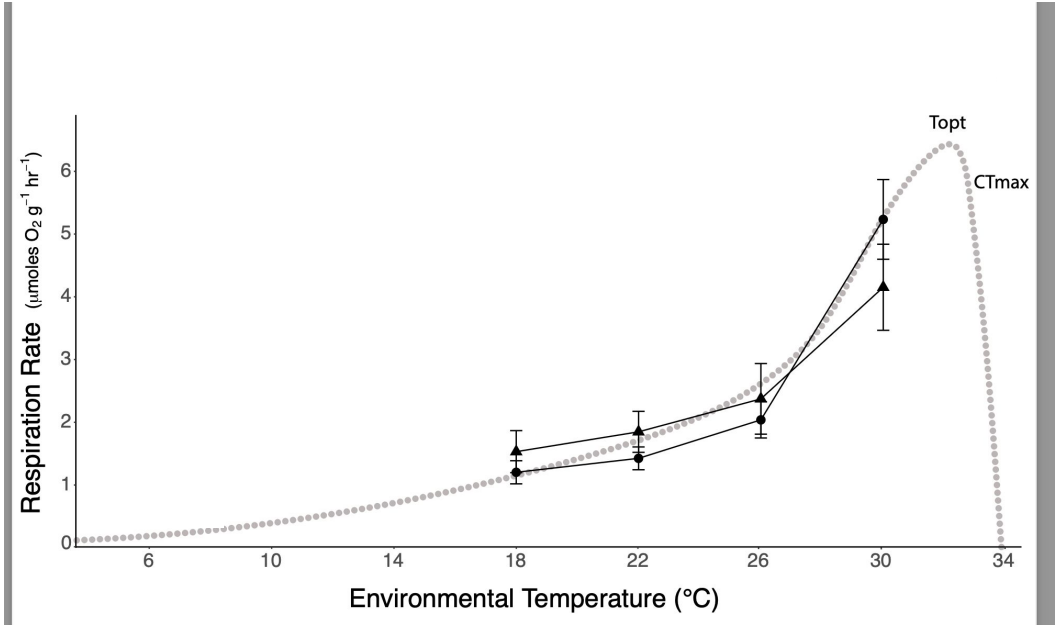

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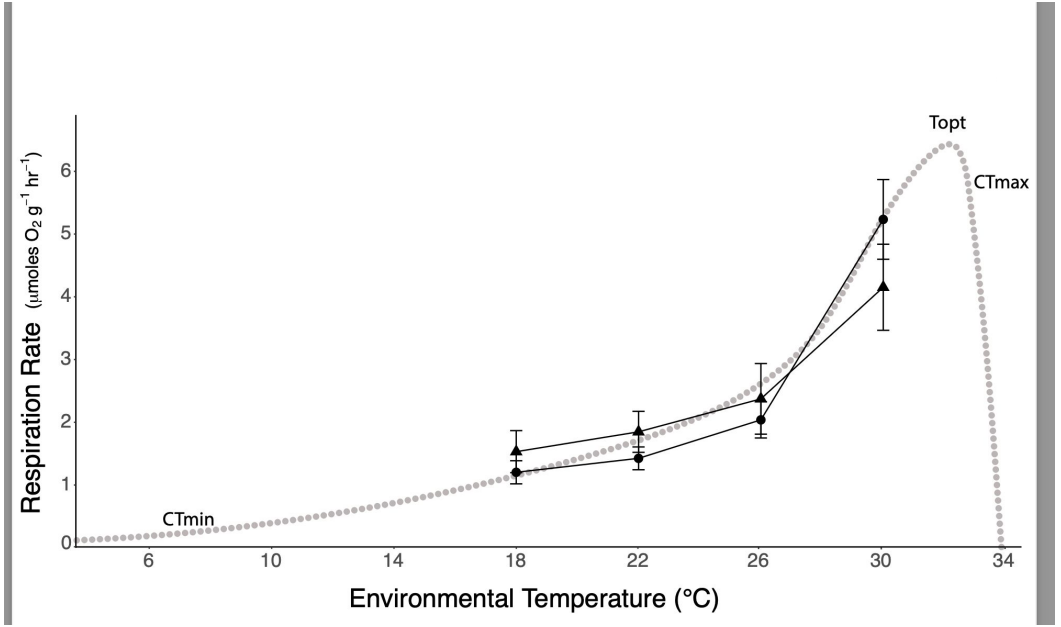

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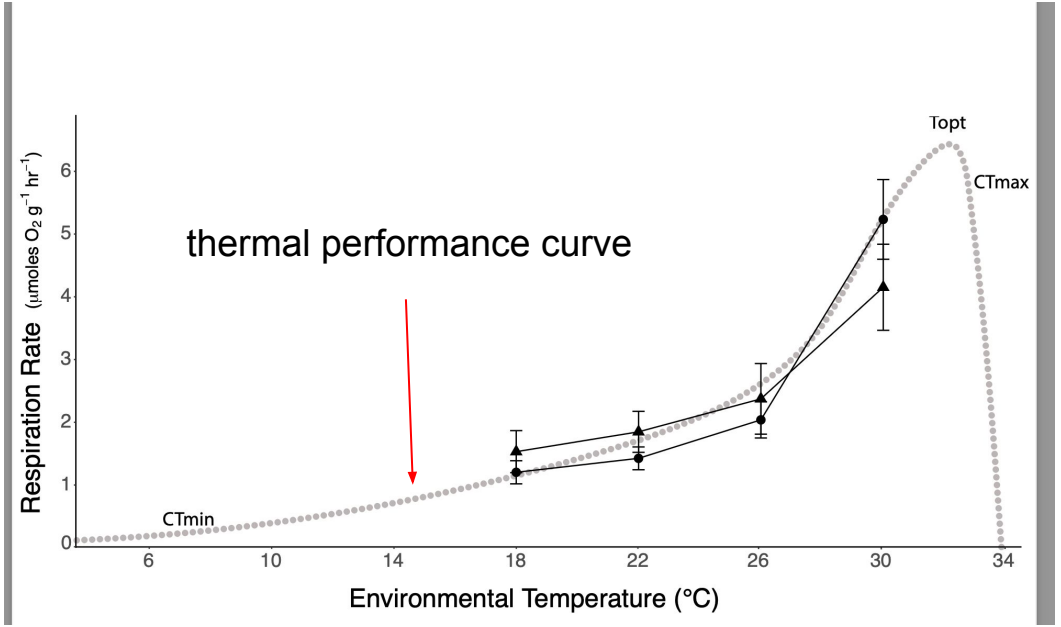

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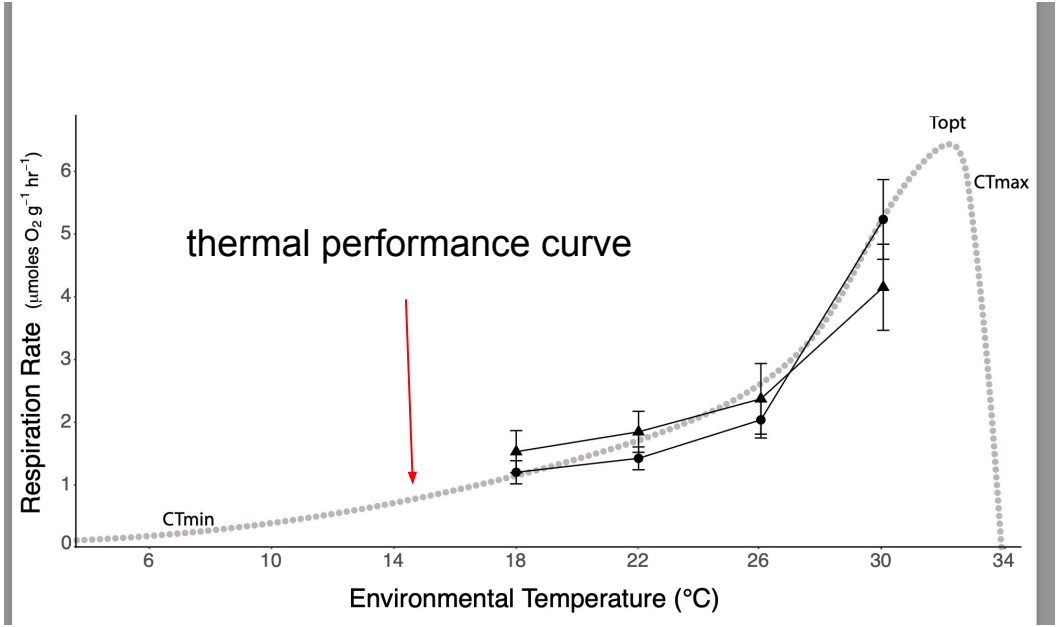

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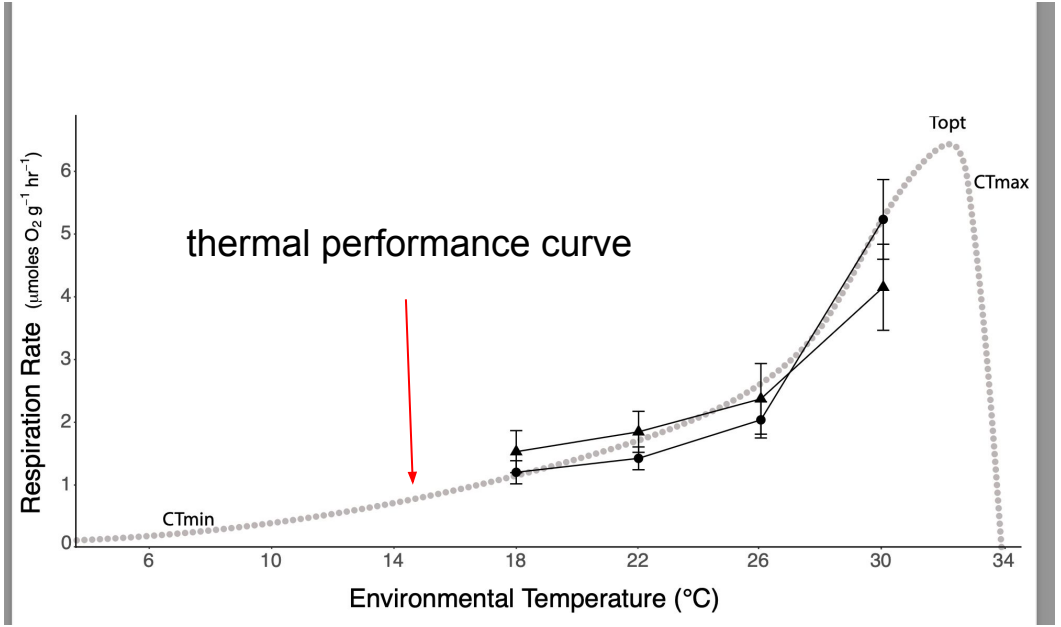
Thermal Breadth:



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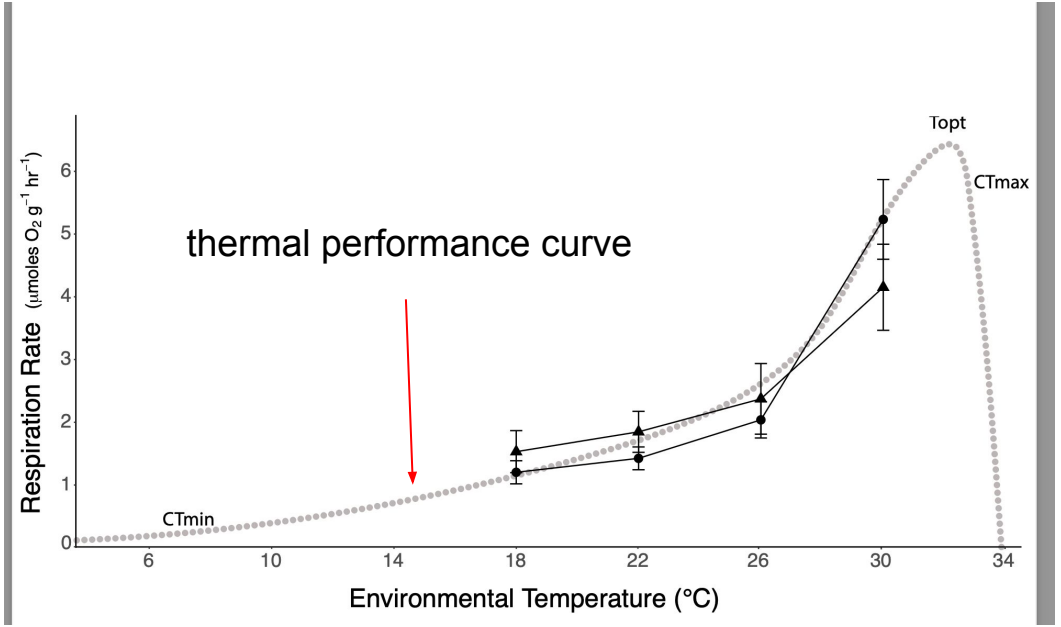
Thermal Breadth:

The range of temperatures that the sea hares are able to live



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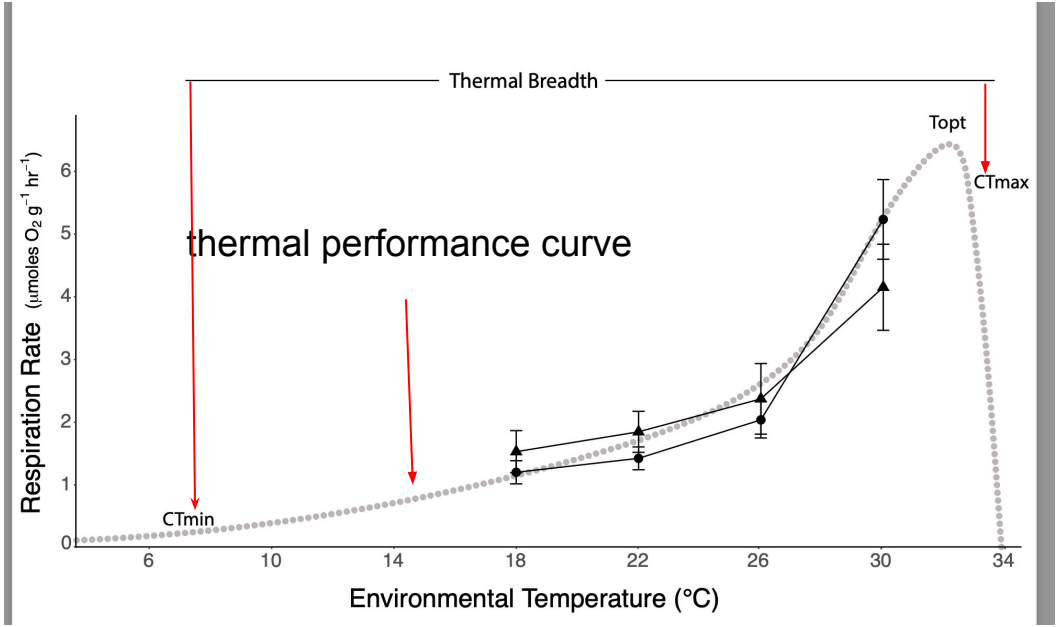

Discussion Question 4!

Turn to a person next to you and discuss:

- Why do you think Dr. Tanner measured *multiple* sea hares at each temperature?

Let’s hear from Dr. Tanner…

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Discussion Question 4!

Turn to a person next to you and discuss:

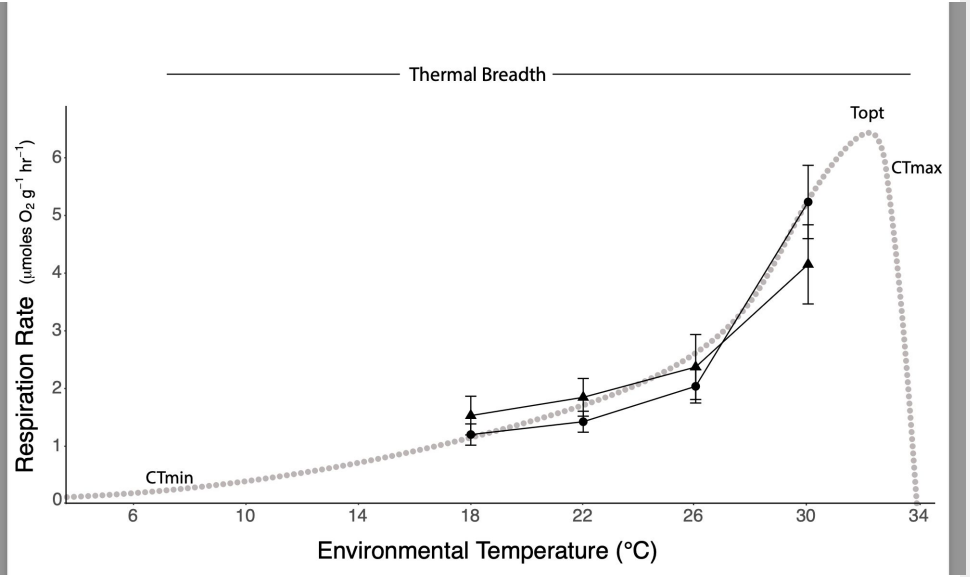
- Why do you think Dr. Tanner measured *multiple* sea hares at each temperature?
- What would be a possible consequence of measuring only one individual at each time point (**and all individual happened to be super strong?**)

Discussion Question 4!

Turn to a person next to you and discuss:

- Why do you think Dr. Tanner measured *multiple* sea hares at each temperature?
- What would be a possible consequence of measuring only one individual at each time point (**and all individuals were sick?**)

Discussion Question 5!



What do you think is significant about these findings?

Let’s hear from Dr. Tanner…

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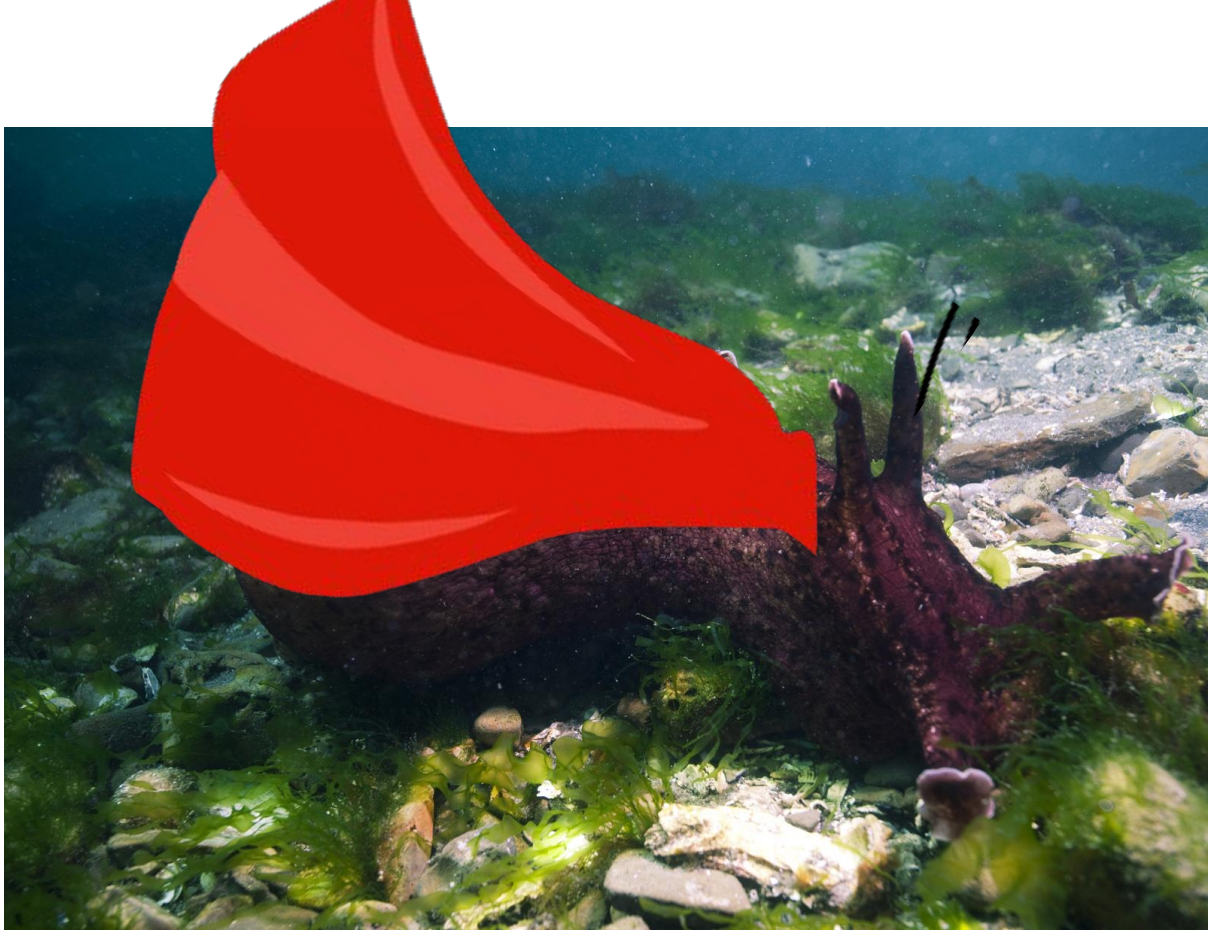

Sea hares = super heros

And there’s no such thing as normal in biology

What kind of scientific questions interest you the most?

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When did you know you wanted to be a scientist?

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Could you tell us more about your experience as a scientist in relation to your own identities?

Can you tell us when you felt a sense of belonging in science?

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How do you balance work with other interests?

What is the most important advice you would give students pursuing science?

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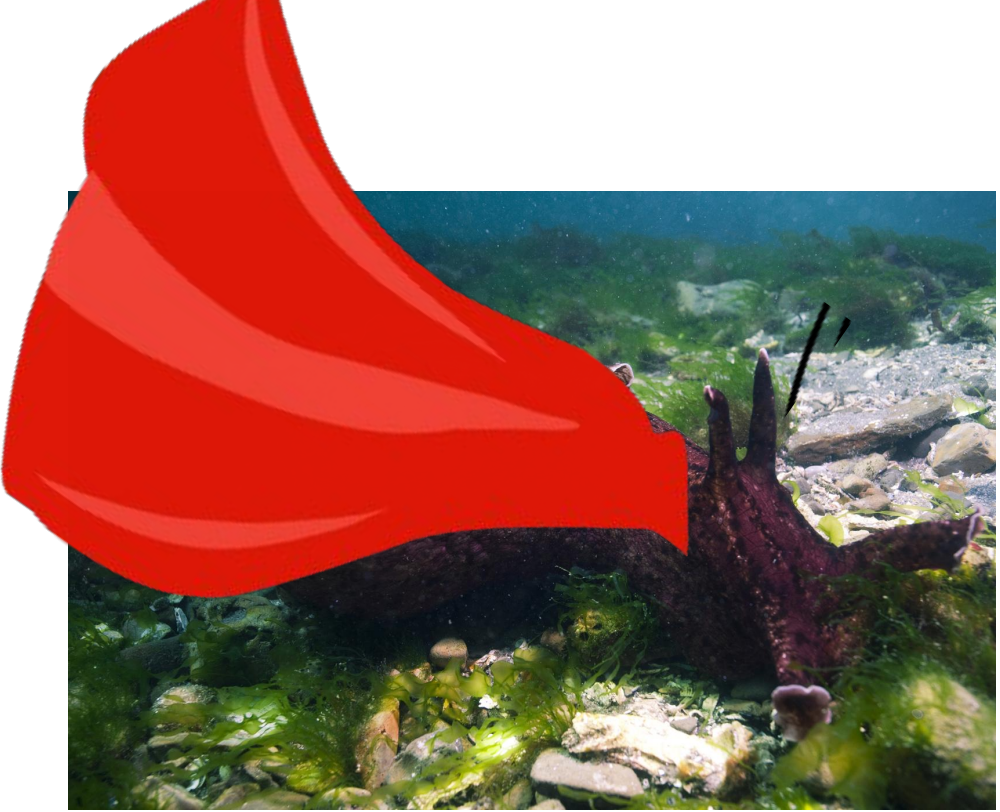
Your Turn!

In your small group choose an organism (the more common it is, the easier it will be to find information, but this is up to you!) and answer the following questions:

1. What is this organisms habitat?
2. Is this organism currently impacted by climate change?
3. As the earth's atmosphere warms, how might this organism be impacted?
4. Given your answer to question three, what would your group propose in order to protect OR stabilize this organism?

Remember our conversation on credible and peer-reviewed sources! You will make a short presentation to share with the class!



Homework:

1. When is a time you felt you belonged in science?
2. What is one thing that surprised (or inspired) you today?
3. What is one question you still have?