Surviving the Extremes: Temperature and Moisture Preferences of Antarctic Soil Bacteria

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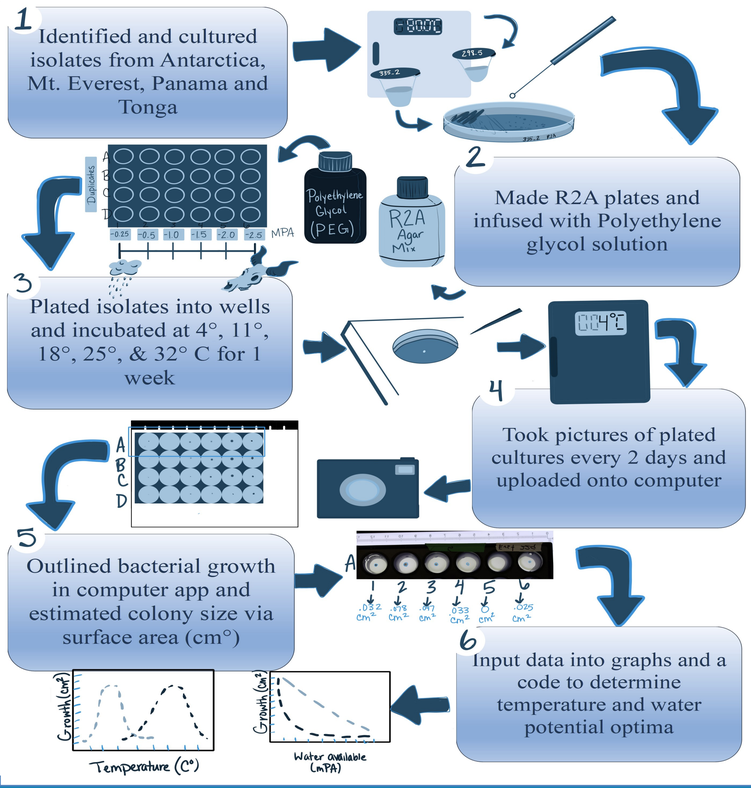
Research Question

Are Antarctic soil bacteria uniquely tolerant of cold and dry conditions?

Introduction

- Despite appearing inhospitable, bacteria like *Arthrobacter flavus* have been found in Antarctic soil, showing remarkable survival and adaptability[1]
- *Arthrobacter*, found around the globe, exhibit flexible responses to environmental stressors[2]

Methods



Results

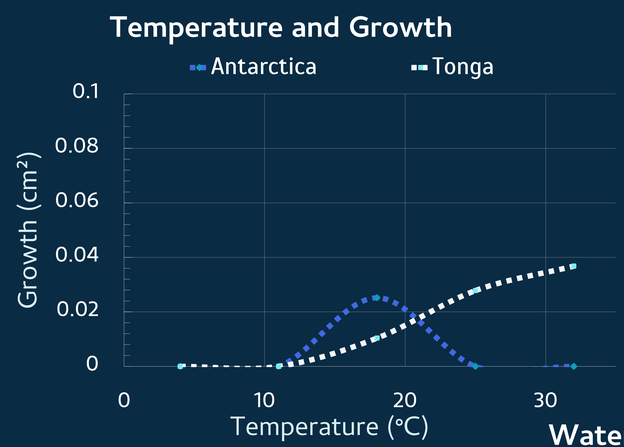
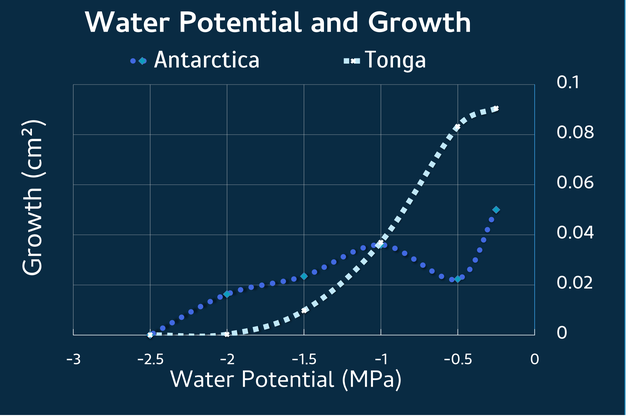
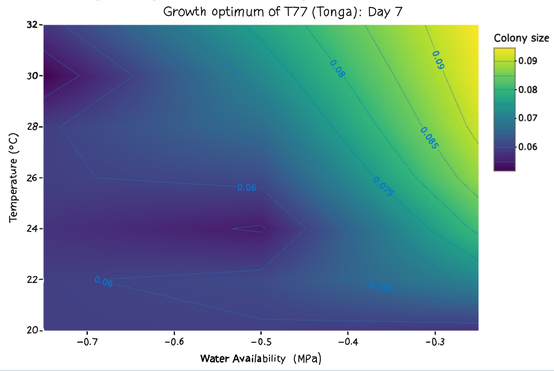


Fig 1. (left) Scatter plot with polynomial lines of best fit indicating isolate growth when incubated at given temperatures

Fig 2. (right) Scatter plot with polynomial lines of best fit indicating isolate growth when agar allows for different water potential at optimum temperature



Tonga (Tropical)



Antarctica (Cold Desert)

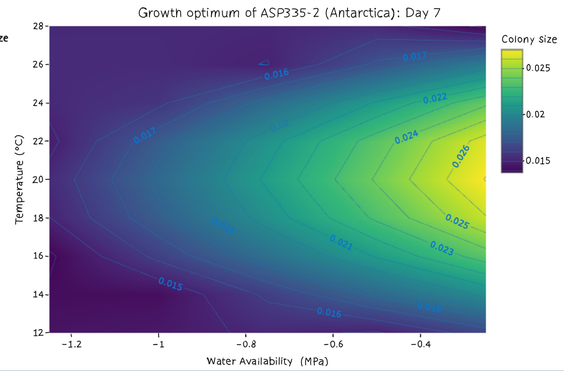


Fig 3 (above). Contour graphs depicting the growth optima of Tonga and Antarctica isolates in the experiment.
Tonga isolate temp optimum: 32° C
Antarctica Isolate temp optimum: 20° C

Discussion

- Antarctic isolate is more tolerant of lower temperatures and moisture than non-Antarctic isolates
- Water availability and temperature are linked (an organism at optimum temperature is more tolerant to less water availability)
- *Arthrobacter* likely to be infrequently active in Antarctica (Antarctica isolate growth temperature optima 20° C)

Future Directions:

- Recreate this experiment with more *Arthrobacter* isolates or another common genus
- Work with genomic data to understand the genetic expression of adaptations

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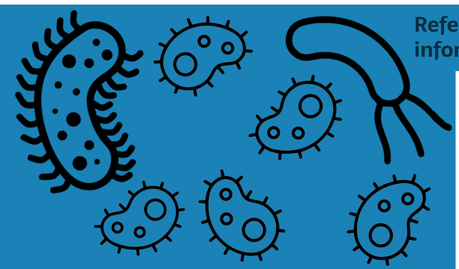
Thank you to the RECCS team for guidance and encouragement.



References and more information on this project: