

# How the Morphology of the Monarch Butterfly Proboscis is Affected by the Season of Emergence

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# Background Information

- Monarch butterflies possess long tubes acting as their mouth called a proboscis that they use to drink nectar from flowers.
- A proboscis is a tube consisting of two halves that are connected by the saliva of butterflies.
- As butterflies can emerge in different seasons, it is relatively unknown if the length of their proboscis changes due to changing flower availability as a function of season.

# Research question and Hypothesis

- How is the proboscis of butterflies affected by the season in which they emerge?
- The butterflies that emerge in summer will have a longer proboscis than those in the fall due to increased availability and diversity in flowers during the summer.

# Methodology

- Step 1
- Soak preserved Butterflies
  - Doing this makes the proboscis of the butterfly more malleable since their bodies are rigid.
  - This allows their proboscis to soak up water and become flexible for stretching.



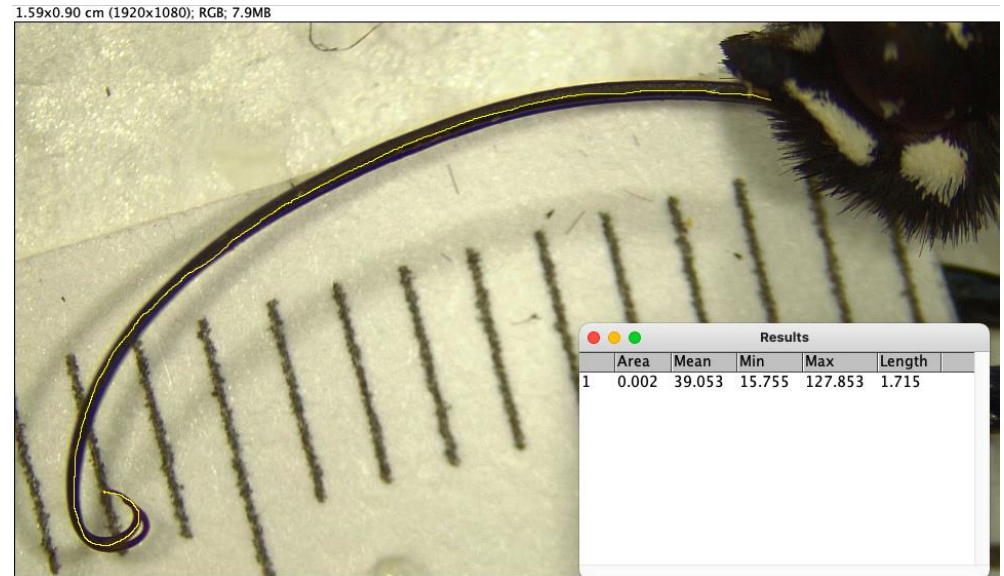
# Methodology

- Step 2
- Extend the Proboscis
  - The proboscis of the butterfly is coiled naturally.
  - Using a pin, the proboscis is extended and left to re-harden.



# Methodology

- Step 3
- Imaging and Measurement of the Proboscis
  - Once it is hardened, the butterfly is put under a dissecting microscope equipped with a digital camera.
  - Images are taken of the butterfly proboscis and measured with a ruler in the field of view.
  - The picture is imported into ImageJ imaging software for quantification.



# Anticipated Results and Role

- We anticipate the the average proboscis length of summer monarchs will be longer than those of fall monarchs.
- We hope to use this information to extend our knowledge of developmental morphology related to seasonality.
- My role is developing this measurement approach by soaking, extending, and measuring each proboscis.

# What I've Learned

- Reading is a major step to application in the lab and throughout research.
- Do not be afraid to ask for help or guidance from others.
- Do not let setbacks get in the way of your ambitions.

# Thank you

