# Dewlap color variation and male visual grasp response across populations in a Neotropical lizard



### Introduction

- The sensory drive hypothesis proposes signals evolve to be most effective in their respective environments, and the receiver's sensory systems in that environment should evolve to match those signals.

- Differences in sexual signals and sensory systems in adjacent habitats may operate as isolating mechanisms. - Lizards in the Anolis genus have pronounced sexual signals ("dewlaps"; Fig 1). We study Anolis aquaticus, a Costa Rican species that exhibits intraspecific variation, as populations' dewlaps vary in redness or yellowness (Fig 1 & 2). - I hypothesize that variation in signals is shaped by sensory drive and facilitates species isolation.



Fig 1. A. aquaticus individuals from different populations ranging from yellow to red in dewlap color



Fig 2. Red and yellow dewlapped A. aquaticus populations localities throughout southern Costa Rica

Janelle B. Talavera, Thomas H.Q. Powell, Lindsey Swierk Binghamton University, Department of Biological Sciences

## **Methods**

- I. Quantifying dewlap color - Used a visual modeling program, Quantitative Color and Pattern Analysis (QCPA) within MicaToolbox in ImageJ to quantify dewlap color (Fig 3A) and conspicuity to the eyes of anoles using standardized photographs (Fig 3B). - Analyzed color and pattern parameters of dewlaps
- from different populations

2. Visual grasp response trials as a proxy for mate choice

- Presented adult female and male anoles to red and yellow stimuli (Fig 3C). Gave each anole 3 seconds to respond to the stimulus (Fig 3D).



Fig 3. (A) Dewlap photo taken in lightbox for visual modeling analysis **(B)** Dewlap photo modeled to the eyes of anoles using visual modeling. (C) Stimuli wheel presented through window on background (D) Set up of experiment inside controlled space

# Acknowledgements

We would like to thank the Southwestern Association of Naturalists, Society of Systematic Biologists, Sigma Xi, Animal Behavior Society, the Organization for Tropical Studies, the National Science Foundation, and the Graduate School of Binghamton University for funding this research.





**Fig 4. (A)** Color map of "yellow" and "red" populations. Y-axis represents measurements of green to red, while X-axis represents measurements of yellow to blue. Red and yellow dewlapped populations overlap by 59.9% (B) Comparison between the "redness" (x mean) in dewlaps at red and yellow sites ( $\chi^2=1$ , df=1, P=0.01526).



(x<sup>2</sup>1.3478, df=1, P=0.2457)

-Redness (x mean) of dewlaps differed among populations while yellowness (y mean) did not. Therefore, confirming color differences among populations. -Preliminary results suggest that female choice for dewlap color is not facilitating reproductive isolation. Overall, males are most likely to respond to red. -I will continue to collect more VGR data this summer and continue with my genomic analyses on aquaticus populations.



### Results

**Fig 5.** Comparison of males vs females grouped by site dewlap color (red and yellow) in the probability of responses to red stimuli ( $\chi^2$ =3.8906, df=1, P=0.04856). Comparison of red vs yellow sites in the probability of response to red stimuli

## Discussion