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Session A, 2017 Second Place: Effect of Both Presence of White Stripe and Size of Organism on Cryptic Color Change in American Toads

Benjamin VanderStouw

Clare Foley

Renee Perrotte

Scott Kostka

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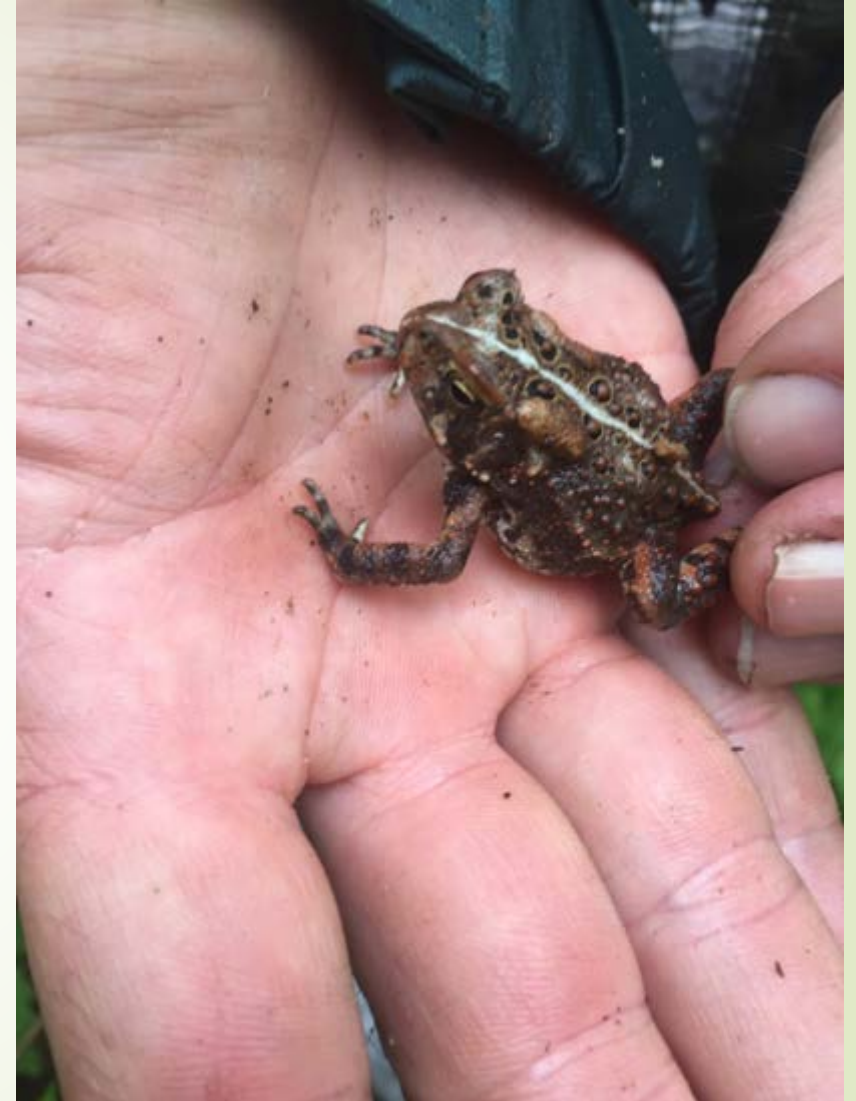
Effect of Both Presence of White Stripe and Size of Organism on Cryptic Color Change in American Toads

Benjamin VanderStouw, Clare Foley,
Renee Perrotte, and Scott Kostka



Introduction

- Observed white-striped American Toad (*Anaxyrus americanus*) assemblages
- Trait only common in Adirondacks (Gibbs, 2017)
- Led to inquiry of toad survivability with distinct markings
- Cryptic coloration (Heinen, 1994)
- Noticed varying sizes of toads



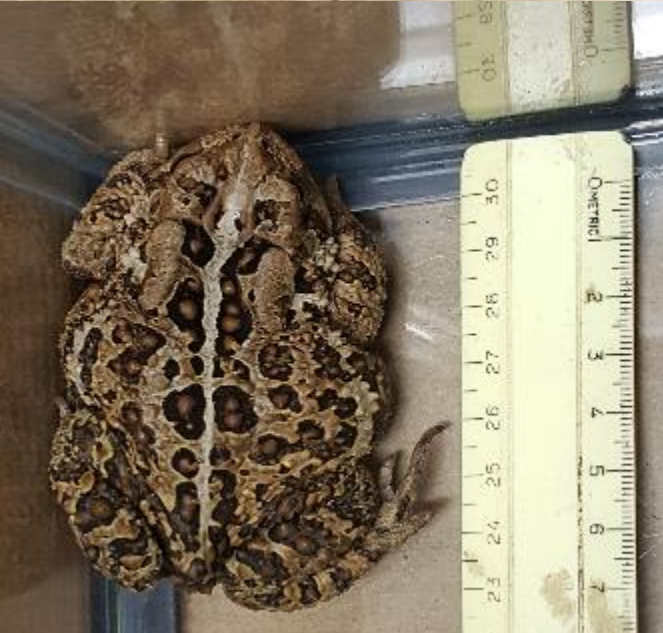


First Hypothesis

- $H_{a, 1}$: American Toads with a distinct white stripe will have a faster rate of color change (measured in change of MCV's per minute) than American toads without white stripes.

Second Hypothesis

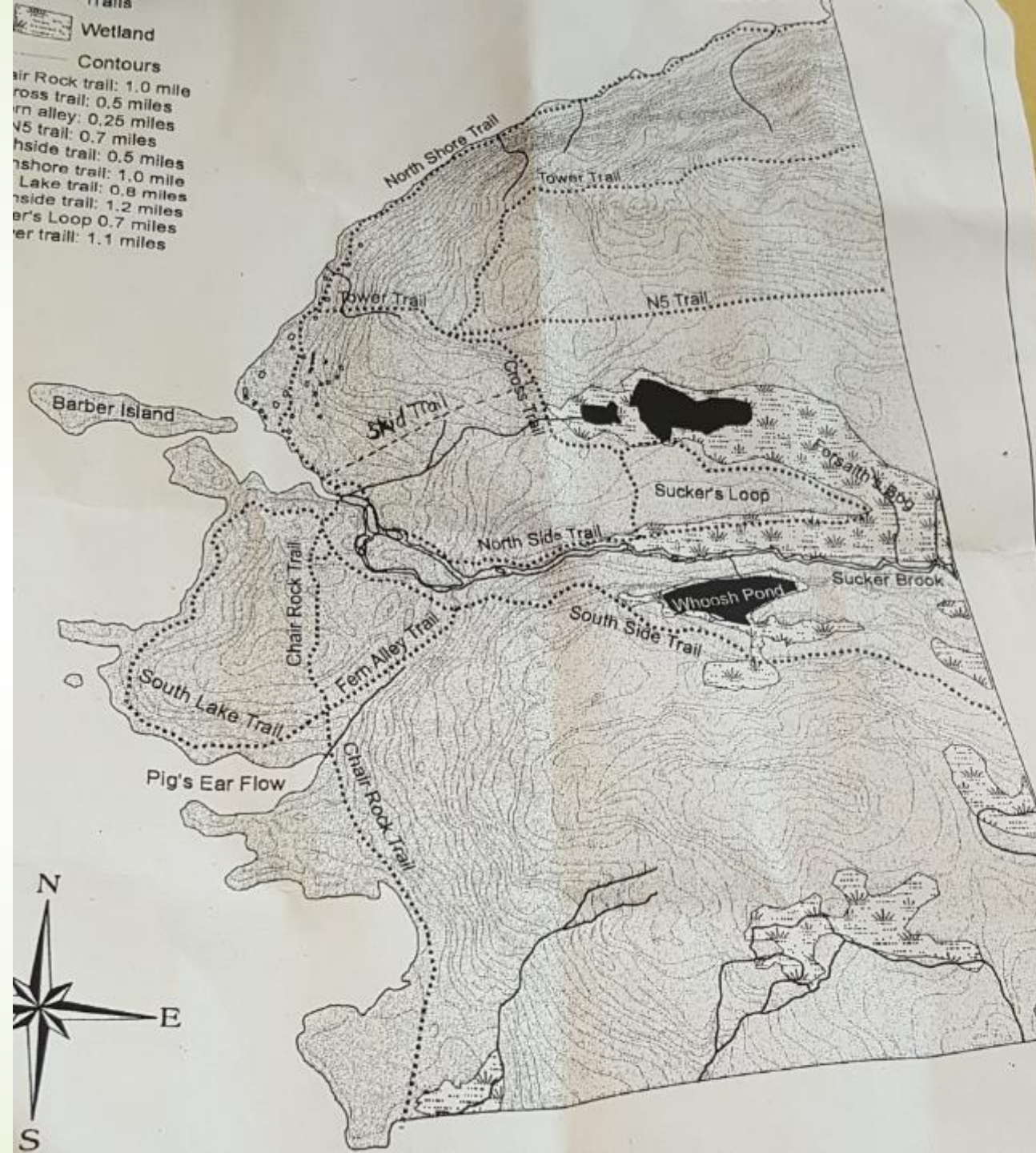
- $H_{a, 2}$: Due to the difference in sizes of the toads, we also hypothesized that smaller toads would undergo a faster color change (change in MCV's per minute) due to their smaller surface area.



Field Methods:

Found toads

Did not find toads



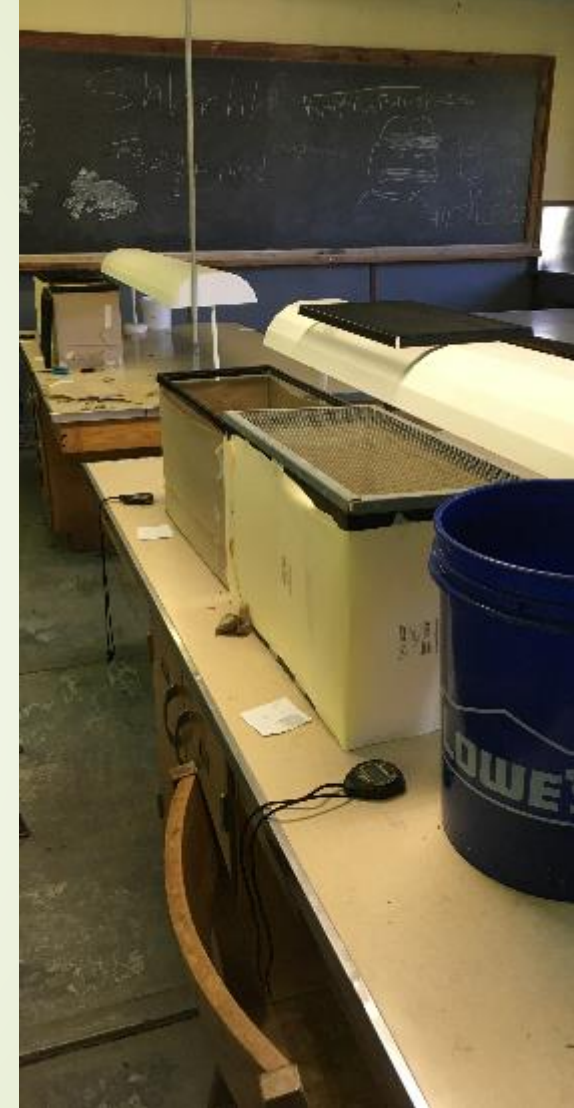
Methods

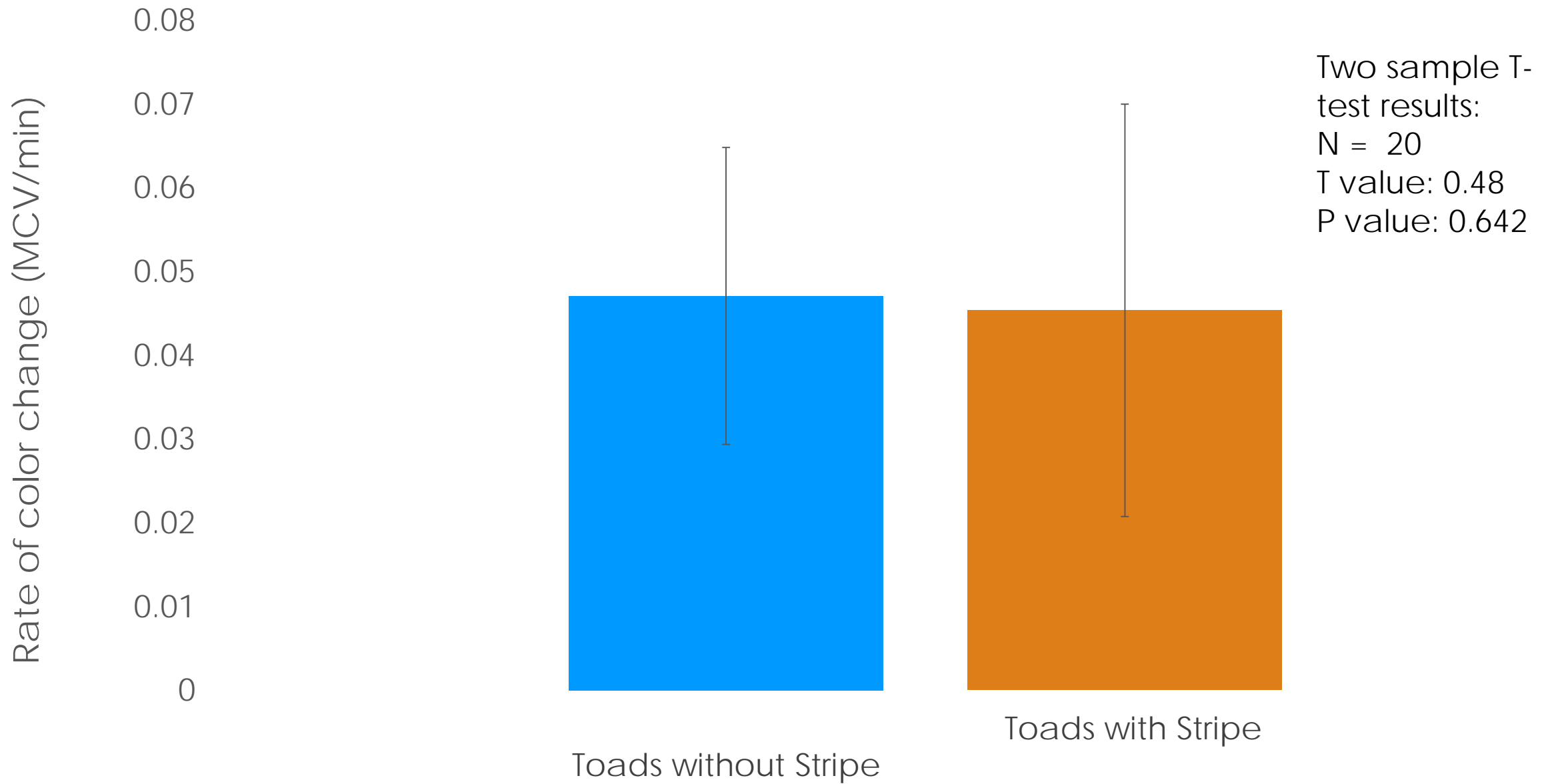
- Determination of size and presence of stripe
- Catalogued 31 toads (Partymiller, n.d.), our experimental and sampling units



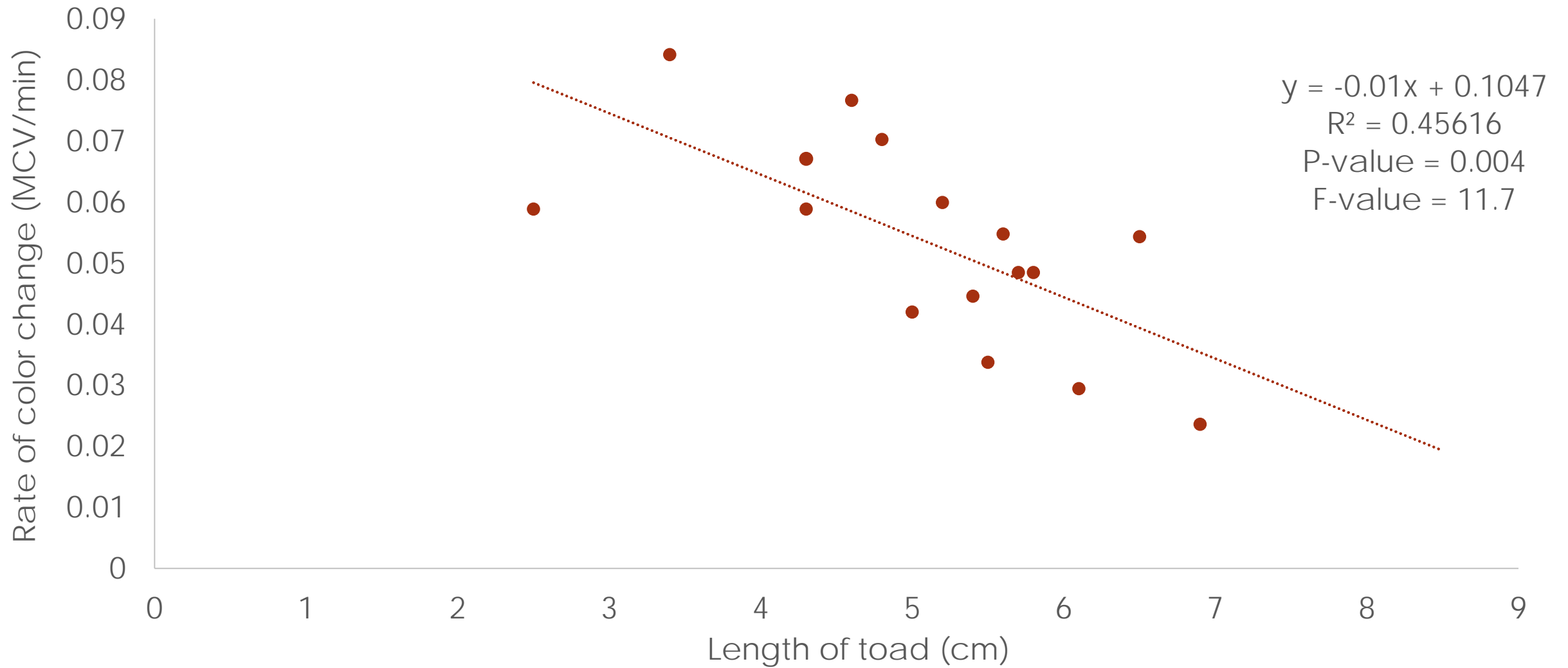
Methods

- 2 hours in light terrarium, 1 hour in dark terrarium
- Conversion of MCV's into Cartesian Plane Coordinates (Ruck & Brown, 2015).
- 2 sample T-test for stripe
- Regression analysis for size





The average rate of change of toads with a white stripe vs toads without a white stripe



Regression analysis: The rate of color change vs toad length without outliers

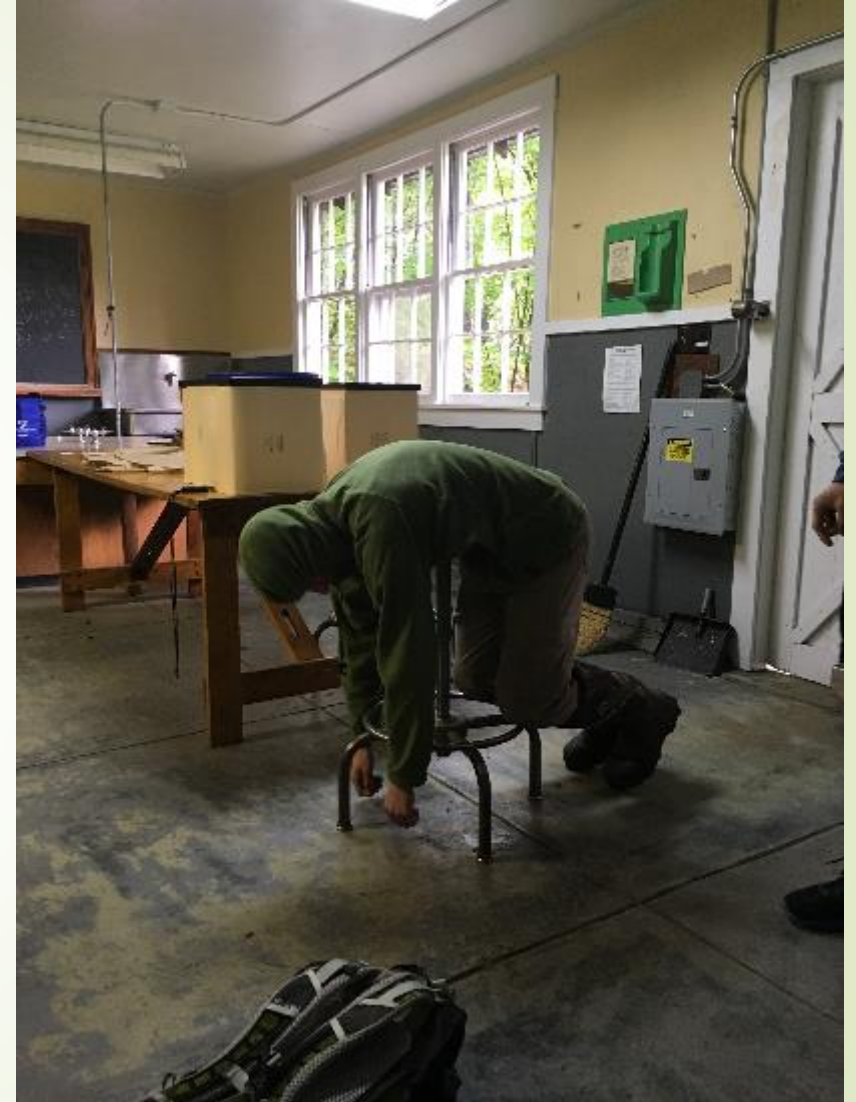
Discussion

- Hypothesis 1; same predators, relative location, habitat, frequency, white stripe vulnerable elsewhere, neutral trait
- Hypothesis 2; length can help explain rate of color change
- Color change was a result of background, but not desiccation(Heinen,1994)
- Predation risk aids in substrate choice for toads, they prefer dark substrate (Heinen, 1993)



Obstacles and Future Studies

- Toad color not homogenous
- Sex and size relationship
- Stressing toads
- Does immediate predation increase color rate of change in toads?
- Do the herbaceous plants in which toads are found aid in their coloration?



Conclusion

- $H_a, 1$: We failed to refute the null hypothesis
- $H_a, 2$: We refuted the null hypothesis
- Much more research can be conducted about white striped toads in the Adirondacks





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Questions?

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