

Abstract

Pseudacris hypochondriaca (Baja California Chorus Frog) and *Pseudacris cadaverina* (California Chorus Frog) are sister species that occur sympatrically in freshwater habitats in parts of Southern California. *P. cadaverina* is typically found on large, granite boulders and *P. hypochondriaca* is most often found in plants, adjacent to ponds and streams. Our hypothesis is that this microhabitat separation may be due to different temperature preferences between these two species. We studied the temperature preferences of these two species using a thermal gradient constructed of a copper half pipe with cooling and heating elements at each end. Across a temperature range of 10-40°C we found a significant difference between species in substrate temperature preference. This difference may corroborate the observed habitat partitioning that allows these two species to occupy two different microhabitat niches, thus facilitating coexistence in the same areas.

Introduction

- *Pseudacris cadaverina* (California Chorus Frog) and *Pseudacris hypochondriaca* (Baja California Chorus Frog) are sympatric (overlapping ranges)
- Commonly found living in the same freshwater habitats in Southern California (syntopic species)
- The mechanisms that permit these two species to coexist in these habitats have not yet been examined
- Spatial partitioning seemed as if it might be the most likely mechanism of resource partitioning based observations made in the field and information found in the literature (Harris 1975; Stebbins 2003; Rorabaugh et. al 2004)
- The two microhabitats that these two species prefer tend to have different substrate temperatures, most likely because of sunlight exposure, proximity to the water and the heat absorbancy of the substrate
- Based on these observations, we hypothesized that the observed habitat partitioning may have a thermal mechanism, and we predicted that the *P. hypochondriaca* would prefer lower substrate temperatures than the *P. cadaverina*

Temperature Preferences of Two Southern California Chorus Frogs, *Pseudacris hypochondriaca* and *Pseudacris cadaverina*

Materials and Methods

- To determine if a thermal preference exists between these two species of frogs, a temperature gradient of 10-40°C (Figure 1) was constructed.

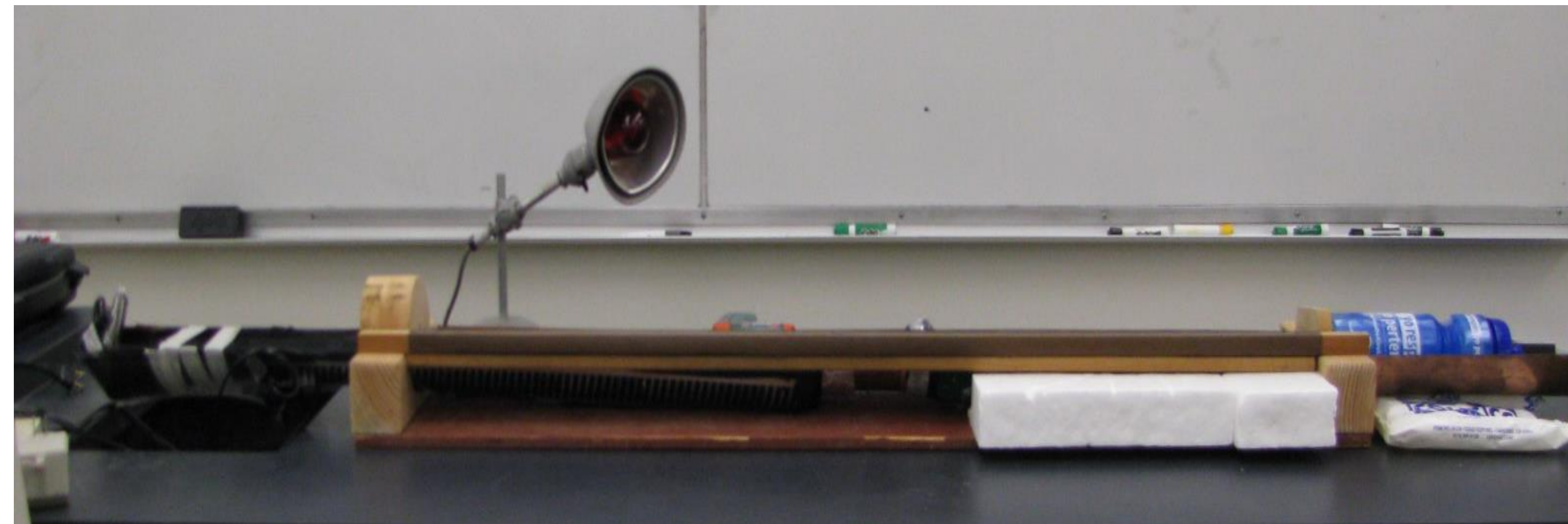


Figure 1. Photograph of our thermal gradient setup, including thermal tape and ice packs underneath the copper half-pipe and the red light used during the trial.

- We collected data from 27 individuals of *P. cadaverina* and from 22 individuals of *P. hypochondriaca*



Figure 2. Picture of *Pseudacris hypochondriaca* in its natural environment.

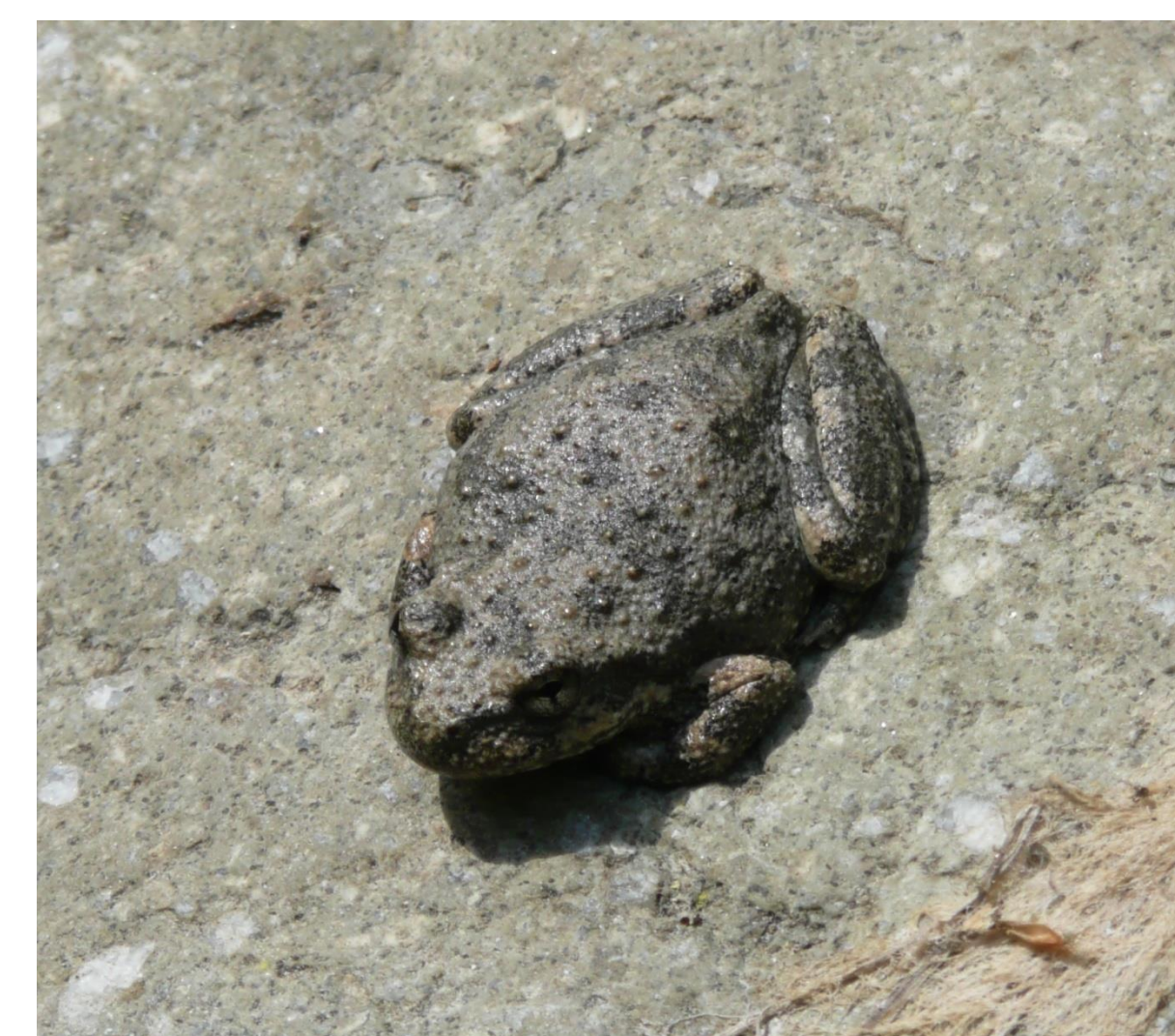
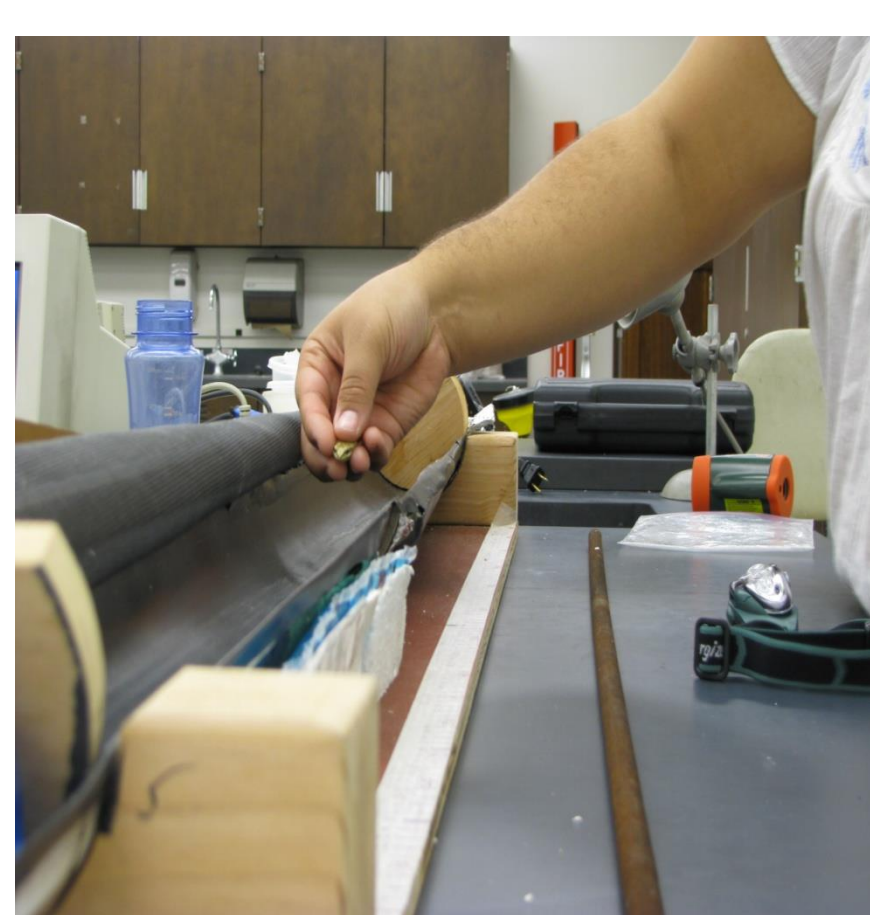


Figure 3. Picture of *Pseudacris cadaverina* in its natural environment.



Figures 4, 5, and 6. Pictures of us taking a temperature measurement of one of the frogs, placing one of the frogs in the gradient and noting the location of one of the frogs in the pipe.

- ✳ Ran an ANOVA model with interaction, with substrate temperature as the response variable and species and sex as factors
- ✳ An ANOVA with no interactions was performed using the same response variable and factors because no interaction was found between species and sex
- ✳ An ANCOVA model was performed using substrate temperature as the response variable with species as the only factor and mass as the covariate

Jessica A. Goodheart and Molly Peters

Mentor: Dr. A. Kristopher Lappin

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Results

- ✳ *P. hypochondriaca* had a mean of 17.81°C and a Standard Error of 1.75°C
- ✳ *P. cadaverina* had a mean of 27.38°C and a Standard Error of 1.46°C
- ✳ A significant difference in substrate temperature was found between *P. hypochondriaca* and *P. cadaverina* ($t=3.67$; $p=0.0007$)
- ✳ Holding mass constant there was still a significant difference in substrate temperature between the two species ($t=3.07$; $p=0.0036$)

Discussion

- *P. hypochondriaca* preferred lower substrate temperatures than *P. cadaverina*; this relates back to their observed preferred substrate temperatures in the field
- The separation in the pipe based on substrate temperature is also a good visual indicator that the substrate temperature difference likely cause the physical separation in the field
- Our next step will be to determine the Evaporative Water Loss (EWL) and Cutaneous Resistance (R_c) for each individual to determine whether higher substrate temperature preference will correlate with a high R_c .
- Conclusions regarding amphibians will also help us to better protect these organisms and conserve the species we have in order to preserve the status quo in the natural environments surrounding us

Literature Cited

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- Some photos taken by P. Singhaseni, M. Peters, J. Goodheart and random google images!