Testing the Effects of Reproductive Character Displacement on Breeding Ecology of Upland Chorus Frogs (*Pseudacris feriarum*)

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Abstract

▶ Two chorus frog species (*Pseudacris feriarum* & *P. nigrita*) hybridize in areas of geographic overlap (sympatry) in the southeastern U.S.
▶ To avoid costly hybridization, sympatric female *P. feriarum* have driven males to evolve mating signals that are very different from *P. nigrita* (Lemmon 2009).
▶ These divergent sympatric calls are more energetically costly for males to produce than non-divergent allopatric calls (Lemmon 2009).
Due to this difference in energetic calling cost between sympatric and allopatric *P. feriarum* populations we ask the following research questions:
(1) Does the length of the nightly calling period differ between populations?
(2) Does the number of active breeding nights (# nights males call/year) differ between populations?
(3) Does the number of males calling each night differ between populations?

Introduction

▶ Speciation occurred between *P. feriarum* and *P. nigrita* ~8 million years ago. ▶ Hybridization between species produces hybrid males with unattractive mating calls and dysfunctional sperm, which results in partial male sterility (Lemmon & Lemmon 2010).
▶ To avoid hybridization, female *P. feriarum* evolved mating preferences for males with divergent calls.
▶ In response, sympatric males evolved energetically-costly calls with high **pulse rates** and **pulse numbers**.
▶ In this study, I address whether producing more energetically-costly calls has compelled males to reduce their total calling effort during a breeding season.

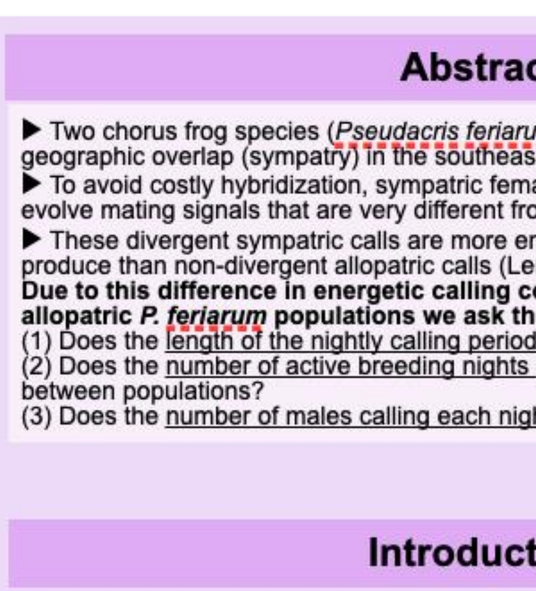

Figure 1. Distribution of two *Pseudacris* species within the southeastern United States. Circles and triangles indicate populations previously studied. Circles containing stars indicate populations studied in this project.

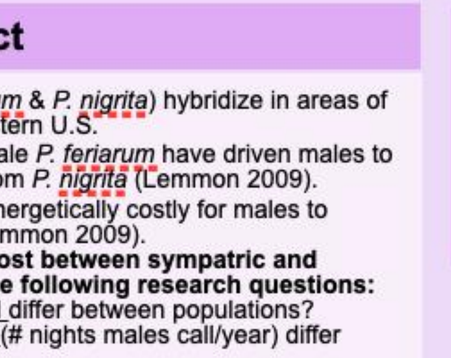

Figure 2. *P. feriarum* male calling in a breeding pond in the Apalachicola National Forest, Florida.

Figure 3. *P. feriarum.*

Figure 4. *P. nigrita.*

Methods

▶ Passive acoustic monitoring is underway Dec-May 2025 at six sites using SongMeter Micro recorders (Wildlife Acoustics).
▶ Five minutes are recorded of every hour.
▶ Three sympatric and three allopatric *P. feriarum* sites are currently being recorded in the Apalachicola National Forest near Tallahassee, Florida (sympatry) and the Tuskegee National Forest near Auburn, Alabama (allopatry).

Figure 5. Recorders being set up at sympatric sites in Florida.

Expected Results

▶ I expect that *P. feriarum* males in sympatry will have reduced length in their nightly signaling period, reduced number of days that they call, and an increased density of calling individuals during choruses.
▶ I expect these outcomes because sympatric males need to call for shorter amounts of time and over a short season (in denser choruses) to compensate for producing costly calls.
▶ These results would be consistent with previous studies on gray treefrogs (*Hyla versicolor*) that exhibit energetic trade-offs in calling behavior (Wells 2007).

Discussion

▶ Decreases in nightly and seasonal breeding period lengths with greater intensity could indicate that sympatric frogs are compensating for the greater calling costs by calling for shorter amounts of time and in larger breeding congregations.
▶ Decreases in nightly and seasonal breeding period lengths without an increase in intensity could indicate that less breeding is occurring in sympatry.
▶ No decrease in nightly and seasonal breeding periods could indicate that *P. feriarum* males are able to absorb the greater energetic costs of sympatric calls.
▶ Increases in breeding intensity could increase competition among sympatric *P. feriarum* males.

Figure 6. The allopatric habitat in the Tuskegee National Forest

References

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Acknowledgements

Thank you to Dr. Alan Lemmon, Dr. Emily Lemmon, Dr. Maya Stokes, and graduate student Alexis Culley for helping me set up my recording devices at the recording sites. Thank you to Ms. McAllister for providing the Charles M. McAllister Biological Studies Student Support Fund and to the Scholarship Committee for providing the Biological Science Alumni Scholarship Fund.