

Journal of the Arkansas Academy of Science

Volume 74

Article 18

2020

First Record and Notes on the Ecology of the Boreal Chorus Frog (*Pseudacris maculata*) in Arkansas

Matthew B. Connior

NW Arkansas Community College, mconnior@nwacc.edu

Kory G. Roberts

Rogers High School

Follow this and additional works at: <https://scholarworks.uark.edu/jaas>

 Part of the [Life Sciences Commons](#)

Recommended Citation

Connior, Matthew B. and Roberts, Kory G. (2020) "First Record and Notes on the Ecology of the Boreal Chorus Frog (*Pseudacris maculata*) in Arkansas," *Journal of the Arkansas Academy of Science*: Vol. 74 , Article 18.

Available at: <https://scholarworks.uark.edu/jaas/vol74/iss1/18>

This article is available for use under the Creative Commons license: Attribution-NoDerivatives 4.0 International (CC BY-ND 4.0). Users are able to read, download, copy, print, distribute, search, link to the full texts of these articles, or use them for any other lawful purpose, without asking prior permission from the publisher or the author.

This General Note is brought to you for free and open access by ScholarWorks@UARK. It has been accepted for inclusion in *Journal of the Arkansas Academy of Science* by an authorized editor of ScholarWorks@UARK. For more information, please contact ccmiddle@uark.edu.

First Record and Notes on the Ecology of the Boreal Chorus Frog (*Pseudacris maculata*) in Arkansas

M.B. Connior^{1*} and K.G. Roberts²

¹Northwest Arkansas Community College, One College Drive, Bentonville, AR 72712

²Rogers High School, 2300 S. Dixieland Road, Rogers, Arkansas, 72758

¹Correspondence: mconnior@nwacc.edu

Running Title: First Record and Notes on the Boreal Chorus Frog in Arkansas

Pseudacris maculata, boreal chorus frog, is a small hylid frog found throughout the midwestern United States. In northwestern Arkansas, all *Pseudacris* were previously referred to as *P. triseriata* (Trauth *et al.* 2004). However, the majority of populations of *P. triseriata* in Arkansas were redescribed as *P. fouquettei* (Lemmon *et al.* 2008) based on genetic data from Lemmon *et al.* (2007). Based on these genetic data, Lemmon *et al.* (2007) suggested *P. maculata* occurs in extreme northwestern Arkansas; however, no specimens of *P. maculata* from Arkansas were included in the study. Thus, our study was conducted to confirm occurrence in the state and to examine the ecology of this species in Arkansas, specifically regarding habitat, diet, reproduction, and parasites.

Populations of chorus frogs were sampled from select areas of the northwestern portion of the state (Benton and Madison counties) to determine if *Pseudacris maculata* occurs in Arkansas as suggested by Lemmon *et al.* (2007). Between March 2008 and March 2016, opportunistic data were collected during the spring breeding season by listening for breeding choruses of male *Pseudacris* frogs in roadside ditches, fishless ponds, and ephemeral wetlands (Fig. 1). When a *Pseudacris* population was located, a sample of individuals was collected and identified using mitochondrial DNA analysis. Methods for the mitochondrial DNA analysis followed Moriarty and Cannatella (2004). DNA was extracted from tissue using the Qiagen DNeasy kit. Two primers (16sc/16sd) were used to amplify the region of the 16S rRNA mitochondrial genes via polymerase chain reaction. When *P. maculata* were positively identified, a subsample was necropsied for parasite infections, diet, and reproductive notes. Specimens were placed in individual bags on ice and within 48 hrs frogs were overdosed with a 10% v/v ethanol solution (HACC 2004). A mid-ventral incision from mouth to cloaca was made to expose the gastrointestinal tract. Specimens were examined for select protists, including

the gall bladder for myxozoans and the rectum for opalinids and ciliates (McAllister 1987; 1991). For helminths, the entire gastrointestinal tract was examined. Trematodes were stained with acetocarmine and mounted in Canada balsam for identification. Reproductive status of females was noted by the presence of ovarian eggs. When females were gravid, clutch size was determined by counting yolked ovarian follicles. Additionally, food items were identified to the lowest taxon possible.

Voucher specimens of parasites that were new host records were deposited in the Harold W. Manter Parasitology Lab (HWML), Lincoln Nebraska. Voucher specimens of *Pseudacris maculata* were deposited in the Sternberg Museum of Natural History (MHP), Fort Hayes, Kansas, Henderson State University Herpetological Collection (HSU), Arkadelphia, Arkansas, and Arkansas State University Herpetological Collection (ASUMZ), State University, Arkansas.

The only confirmed site for *Pseudacris maculata* was in Benton Co. near Pea Ridge (N 36°27'26; W 94°03'36). On 2 March 2008, a male *Pseudacris* frog was the first specimen from Arkansas to be genetically identified as *P. maculata* (MHP 14025). All other populations that we sampled were genetically confirmed to be *Pseudacris fouquettei*. Ten *P. maculata* were collected in 2015 and 2016, respectively. We collected limited data on food habits of *P. maculata* as only a few frogs that were necropsied contained food in their stomachs. However, 3 of 20 frogs had a single food item each: terrestrial isopod, gastropod (Hydrobiidae), and Hirudinae (only contained half of the mid body). Most breeding activity that we observed occurred during February and March at this site with calling choruses and both males and females present. Three female *P. maculata* collected were gravid and had the following clutch sizes: SVL 28 mm- 480 eggs; SVL 29 mm- 185 eggs; SVL 30 mm-371 eggs. Three species of

endoparasites were found in *Pseudacris maculata*: *Opalina* sp., *Myxidium melleni*, and *Langeronia microcirra* (HWML 98399). *Opalina* and *Myxidium* were collected in 2015 with 2 of 10 frogs infected with *Opalina* and 4 of 10 frogs infected with *Myxidium*. *Langeronia* were collected in 2016 with 6 of 10 frogs infected with an average of 2.5 trematodes per host (range 1–5).

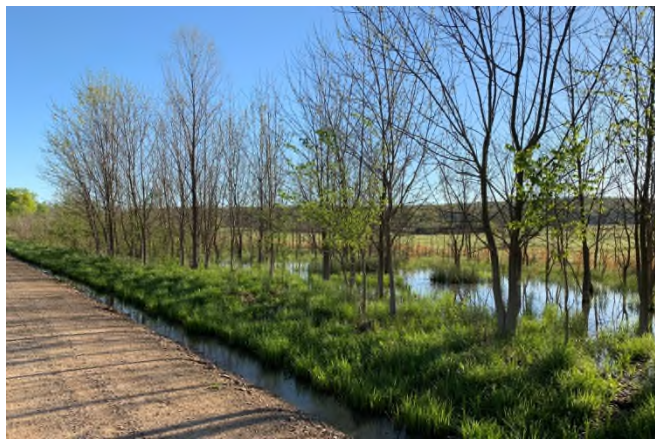


Figure 1. Typical breeding habitat of *Pseudacris maculata*.

This study is the first to report a genetically confirmed population of *Pseudacris maculata* in Arkansas. The breeding season we observed in Arkansas is similar as previously reported elsewhere (Dodd 2013). Our egg count range of 185–371 falls within the reported range of 137–793 (Pettus and Angleton 1967). Our limited data over food habits do not elucidate much regarding diet. However, chorus frogs eat mainly small invertebrates (Dodd 2013) as we found in our study.

Opalina sp. and *Myxidium* have been reported from every hylid host that inhabits Arkansas (Muzzall and Sonntag 2012; McAllister *et al.* 2013), including the newly documented *Hyla squirella* from Arkansas (Connior *et al.* 2014). Both of these parasites are ubiquitous in amphibians. The trematode *L. microcirra* is a new host record and distributional record for the state. Although we were only able to confirm one population of *P. maculata*, we suspect further systematic distributional surveys will produce additional breeding populations within the extreme northwestern portion of Arkansas. In fact, during March 2020, some small populations of chorus frogs were heard in the vicinity of the known locale but were not collected or analyzed for species identification.

Acknowledgments

We thank E. M. Lemmon and lab staff (FSU) for the DNA analysis, C. T. McAllister and C.R. Bursey provided parasite identifications, and S. Chordas III provided food item identification. We thank P. Pilitt (USNPC), R. Tumilson (HSU), and S. E. Trauth (ASUMZ) for curatorial assistance. The Arkansas Game and Fish Commission provided Scientific Collecting Permits to MBC and KR.

Literature Cited

- Connior MB, T Fulmer, CT McAllister, SE Trauth, and CR Bursey. 2014. Ecology of the squirrel treefrog (*Hyla squirella*) in Arkansas. *Journal of the Arkansas Academy of Science* 68:52-56.
- Dodd CK Jr. 2013 *Frogs of the United States and Canada*. 2 Vols. Johns Hopkins University Press, (Baltimore). xxvii + 962 p.
- Herpetological Animal Care Use Committee (HACC) of the American Society of Ichthyologists and Herpetologists. 2004. Guidelines for use of live amphibians and reptiles in field and laboratory research. Second Ed. Available: http://www.research.fsu.edu/acuc/policies_Guidelines/ASIH_HACC_GuidelinesAmphibians.pdf
- Lemmon EM, AR Lemmon, JT Collins, and DC Cannatella. 2008. A new North American chorus frog species (Amphibia: Hylidae: *Pseudacris*) from the south-central United States. *Zootaxa* 1675:1-30.
- Lemmon EM, AR Lemmon, JT Collins, JA Lee-Yaw, and DC Cannatella. 2007. Phylogeny-based delimitation of species boundaries and contact zones in the trilling chorus frogs (*Pseudacris*). *Molecular Phylogenetics and Evolution* 44:1068-1082.
- McAllister CT. 1987. Protozoan and metazoan parasites of Strecker's chorus frog, *Pseudacris streckeri streckeri* (Anura: Hylidae), from north-central Texas. *Proceedings of the Helminthological Society of Washington* 54:271-274.
- McAllister CT. 1991. Protozoan, helminth, and arthropod parasites of the spotted chorus frog, *Pseudacris clarkii* (Anura: Hylidae), from north-central Texas. *Journal of the Helminthological Society of Washington* 58:51-56.

First Record and Notes on the Boreal Chorus Frog in Arkansas

- McAllister CT, CR Bursey, MB Connior, and SE Trauth.** 2013. Symbiotic protozoa and helminth parasites of the Cajun chorus frog, *Pseudacris fouquettei* (Anura: Hylidae), from Southern Arkansas and Northeastern Texas, U.S.A. *Comparative Parasitology* 80:96-104.
- Moriarty EC and DC Cannatella.** 2004. Phylogenetic relationships of the North American chorus frogs (*Pseudacris*: Hylidae). *Molecular Phylogenetics and Evolution* 30:409-420.
- Muzzall PM and E Sonntag.** 2012. Helminths and symbiotic Protozoa of Blanchard's cricket frog, *Acris blanchardi* Harper, 1947 (Hylidae), from Michigan and Ohio, U.S.A. *Comparative Parasitology* 79:340-343.
- Pettus D and GM Angleton.** 1967. Comparative reproductive biology of montane and piedmont chorus frogs. *Evolution* 21:500-507.
- Trauth SE, HW Robison, and MV Plummer.** 2004. *The Amphibians and Reptiles of Arkansas*. Fayetteville: University of Arkansas Press. 421 p.