Zootaxa 1675: 1–30 (2008)
www.mapress.com/zootaxa/

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

A new North American chorus frog species (Amphibia: Hylidae: *Pseudacris*) from the south-central United States

EMILY MORIARTY LEMMON[1,5], ALAN R. LEMMON[1,5], JOSEPH T. COLLINS[2,3] & DAVID C. CANNATELLA[1,4]

[1]*Section of Integrative Biology, 1 University Station C0930, The University of Texas, Austin 78712.*
E-mail: chorusfrog@mail.utexas.edu, alemmon@evotutor.org, catfish@mail.utexas.edu
[2]*Kansas Biological Survey, Higuchi Hall, 2101 Constant Avenue, The University of Kansas, Lawrence 66047.*
E-mail: jcollins@ku.edu
[3]*Sternberg Museum of Natural History, 3000 Sternberg Drive, Fort Hays State University, Hays, Kansas 67601*
[4]*Texas Memorial Museum, 2400 Trinity St., University of Texas, Austin 78705*
[5]*Section of Evolution and Ecology, 2320 Storer Hall, The University of California, Davis 95616.*
E-mail: emlemmon@ucdavis.edu (present address)

Table of contents

Abstract

We describe a new species of chorus frog of the North American treefrog genus *Pseudacris* from the south-central United States. This new species is morphologically similar to the parapatric species *P. feriarum* and has thus previously been considered synonymous with this species. The new species is geographically distinct from *P. feriarum* and from its sister species, *P. nigrita*. We diagnose the new species based on advertisement call, morphological, and genetic characters.

Key words: chorus frogs, *Pseudacris fouquettei*, Cajun chorus frog, *Pseudacris feriarum*, *Pseudacris maculata*, *Pseudacris nigrita*, *Pseudacris triseriata*, advertisement call, morphology, new species

Introduction

The chorus frog genus *Pseudacris* (family Hylidae) is derived from a treefrog lineage that expanded from Central America and Mexico, giving rise to the North American sister genera *Acris* and *Pseudacris* (Smith *et al.* 2005). The chorus frogs radiated within the United States to form at least 16 species during the period from

Accepted by M. Vences: 11 Nov. 2007; published: 9 Jan. 2008

the late Oligocene (approximately 26 million years ago [ma]) to the Pliocene (approx. 3 ma; Moriarty and Cannatella 2004; Recuero *et al.* 2006; Lemmon *et al.* 2007a). The highest species diversity occurs in the southeastern United States, where as many as seven species occur sympatrically (Conant and Collins 1998).

The trilling chorus frogs—including the *nigrita* complex (Smith and Smith 1952) plus *P. brachyphona* and *P. brimleyi*—form a subclade within *Pseudacris* (Moriarty and Cannatella 2004). Members of this clade produce trilled (pulsed) advertisement calls; this characteristic distinguishes them from most other sympatric *Pseudacris*, which produce unpulsed calls. The trilling frogs have long been the subject of taxonomic debate due to the morphological conservatism among the species (Neill 1949; Smith and Smith 1952; Smith 1956; Schwartz 1957; Crenshaw and Blair 1959; Batts 1960; Platz and Forester 1988; Platz 1989). This phenotypic similarity across wide geographic areas has made it difficult to determine the true diversity of species within the genus, the range boundaries of taxa, and the phylogenetic relationships among species.

Smith and Smith (1952) and Smith (1956) used morphometric measurements (tibia/body length, head width/body length, head length/body length ratios) from a large number of populations across much of North America to propose geographic boundaries for three taxa, *Pseudacris triseriata*, *P. feriarum*, and *P. maculata* (referred to as *P. nigrita triseriata*, *P. n. feriarum*, and *P. n. maculata*, respectively). They used clines primarily in tibia/body length ratios to delineate range limits of these taxa. Platz and Forester (1988) and Platz (1989) recorded advertisement calls of 22 populations from part of this region and compared behavioral patterns to morphological patterns, finding some support for the conclusions of Smith and Smith (1952). These studies, however, were unable to reveal the full species diversity within trilling *Pseudacris*.

Recent phylogenetic work based on mitochondrial DNA indicated that *Pseudacris feriarum* populations do not form a monophyletic clade (Moriarty and Cannatella 2004). Intriguingly, populations in Kentucky group with *P. triseriata* and *P. kalmi*, whereas Louisiana and Arkansas populations are most closely related to *P. nigrita*. This puzzling result provided the impetus for a broad-scale phylogeographic study that included 253 populations of chorus frogs from across North America (Lemmon *et al.* 2007b). The results of this study clarified the finding of Moriarty and Cannatella (2004) and revealed a cryptic species, previously considered to be part of the wide-ranging *P. feriarum*.

Here, we describe a new morphologically cryptic species of chorus frog. The new species is intermediate with respect to morphology between *P. feriarum* and *P. nigrita*, but distinct from *P. maculata*. This new taxon is distinct from *P. feriarum* in terms of its advertisement call, distinct from *P. nigrita* with regard to color pattern, and is different from *P. feriarum*, *P. maculata*, *P. triseriata*, and *P. nigrita* genetically, forming the sister clade of the latter species.

Material and methods

Morphometric Analyses. We measured formalin-preserved specimens of four species (*Pseudacris feriarum*, *P. maculata*, *P. nigrita*, and *P.* **sp. nov.**) from 60 counties (19 states) across the eastern United States. Specimens were borrowed from 13 museum collections (see Appendix 1). Sex was determined by examining the vocal sac area of each specimen. If loose skin and dark pigmentation were present, the specimen was identified as a male. In this study, only males were measured, due to the scarcity of females in museum collections. Measurements were taken using Fowler Sylvac Ultra-Cal IV digital calipers (to 0.01 mm), and data were electronically entered into a spreadsheet using a foot pedal connected to the calipers; this minimized the error in transcribing data. All measurements were taken by ARL and include the following ten measurements as defined by Duellman (2001): snout-vent length (SVL; from tip of snout to posterior end of urostyle), head width (HW; width at posterior end of jaw), head length (HL; tip of snout to posterior end of jaw), tympanum diameter (TD; diameter horizontally at widest point), eye width (EW; diameter horizontally at widest point), snout length (Snout; anterior end of eye to naris), femur length (FeL; urostyle to knee), tibia length (TL;

straight distance), foot length (FoL; proximal edge of inner metatarsal tubercle to tip of longest toe), and snout angle (SA; [arcsine((head width / 2) / head length)] x 2).

To control for the effect of body size on morphometric variables, we plotted each variable against body size, fit a line to the data, and saved the residuals (the deviation of each individual point from the line along the y-axis). The residual data were used in place of the raw data for all further analyses. We examined morphometric data of the four species by constructing univariate box-and-whisker plots for the residuals of each variable and by conducting multivariate principal component analyses (PCA). The PCA analyses were performed to determine whether the four species differed in multivariate space and also to identify which characters are most important in separating the species. PC axes explaining up to 95% of the variation were used; all analyses were performed in JMP 5.1 (SAS Institute, Inc.).

Advertisement Call Analyses. We also examined advertisement call structure of each species. The species identity of each population was established based on genetic data (Lemmon *et al.* 2007b). Geographically dispersed populations of *Pseudacris feriarum* (2 populations), *P. maculata* (1 pop.), *P. nigrita* (3 pops.), and *P.* **sp. nov.** (2 pops.) were examined (Fig. 1; Appendix 2). A Sennheiser ME67 directional microphone was used

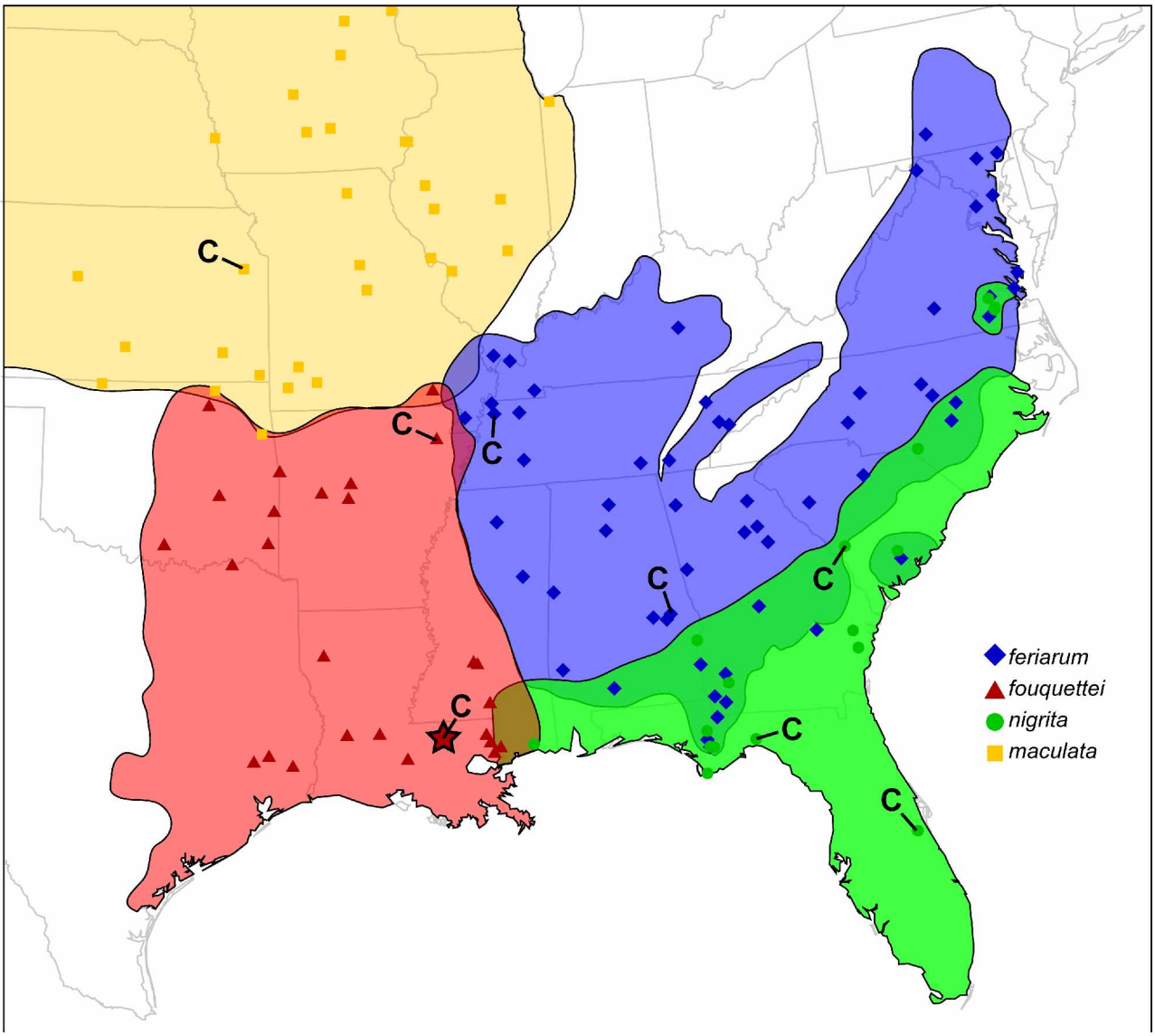

FIGURE 1. Distributions of *Pseudacris feriarum*, *P. fouquettei*, *P. maculata*, and *P. nigrita* in the southern United States based on genetic data (Lemmon *et al*. 2007b). Symbols indicate populations included in genetic analyses. The type locality of *P. fouquettei* is denoted with a star. Capital "C"s indicate populations analyzed for advertisement calls. Populations analyzed for morphometric data are not shown (see Appendix 1).

to record calls onto TDK MA90 metal bias tape cassettes with a portable Sony stereo cassette-recorder (WM-D6C). Calls were digitized using SoundEdit16 version 2 (Macromedia) under a sampling rate of 44100 Hz with a sample size of 16 bits. Calls were analyzed using SoundRuler (reviewed by Bee 2004; http://soundruler.sourceforge.net/) using the following settings: spectrogram FFT length 1024, Hanning window size 1024, amount of overlap between FFT samples 900 and power spectrum FFT length 2048. Call characters were either extracted from the raw data output or calculated from the raw data. The following five call variables were examined: call length (CL; duration of call from 10% maximum amplitude [call onset] to 10% maximum amplitude [offset], call rate (CR; 1 / time from 10% maximum amplitude [onset] to 10% maximum amplitude [onset] for next call), call duty cycle (CDC; call length / call period), pulse number (PN; number of pulses), and call dominant frequency peak (DF; call dominant frequency at the call maximum amplitude). Two call characters (CL and CR) are significantly correlated with temperature, and therefore we corrected these variables to a common temperature of 14°C using species-specific slopes from linear regression analyses (EML unpub. data). We explored patterns in the call data by plotting univariate box and whisker plots of the raw data and by conducting PCA analyses as described above.

***Pseudacris fouquettei* sp. nov.**
(Figs. 2 and 3)
Cajun Chorus Frog

Holotype: (Fig. 2) TNHC 62265 (Texas Natural History Collection; field no. ECM0029), adult male from the United States: Louisiana: East Baton Rouge Parish: (NW of Baywood on Lee Price Road, 1.4 mi W of jct. with SR 37; N30.7147 W90.8919), collected by Emily Moriarty Lemmon and David C. Cannatella on 11 March 2001.

Paratypes: TNHC 62266–62267, same data as holotype and TNHC 63471–63479, same data as holotype except collected 21 February 2003 between 0.3–0.6 mi W of jct. with SR 37 on Lee Price Road.

Etymology: The specific epithet is a patronym for Martin J. "Jack" Fouquette, Jr., who studied *Pseudacris* in the 1960s and 1970s. His extensive unpublished field data were instrumental in efforts to elucidate the species diversity of chorus frogs.

Synonymy: A detailed history of *Pseudacris* nomenclature is available on the Amphibian Species of the World website (Frost 2007).

Diagnosis: *Pseudacris fouquettei* is distinguished from other chorus frogs by 1) genetic data (Lemmon *et al.* 2007b; Gartside 1980), 2) geographic distribution (Fig. 1), 3) advertisement call (Figs. 4–6), and 4) to a lesser degree by morphological data (Figs. 6–7). This small slender species, with a subacuminate snout, has a dorsal pattern of three medium to dark brown longitudinal stripes or rows of spots on a pale tan or gray ground color; a white labial stripe is present.

FIGURE 2. Preserved specimens of *Pseudacris feriarum*, *P. fouquettei*, *P. maculata*, and *P. nigrita* (rows). Top (part 1) and side views (part 2) are shown. Three populations of each species are represented (columns). Specimens are described with localities and field numbers from left to right by species: *Pseudacris nigrita* Harrison Co., Mississippi TNHC 63594; Barnwell Co., South Carolina TNHC 62207; Brevard Co., Florida TNHC 62364; *Pseudacris fouquettei* East Baton Rouge Parish, Louisiana TNHC 62265 (holotype); Evangeline Parish, Louisiana TNHC 62278; Craighead Co., Arkansas TNHC 62264; *Pseudacris feriarum* Macon Co., Alabama TNHC 63128; Obion Co., Tennessee TNHC 62275; Chatham Co., North Carolina TNHC 62288; and *Pseudacris maculata* Douglas Co., Kansas TNHC 62377; Cache Co., Utah TNHC 62406 (juvenile); Warren Co., Iowa TNHC 63370. The black bar corresponds to 1 cm on the specimen.

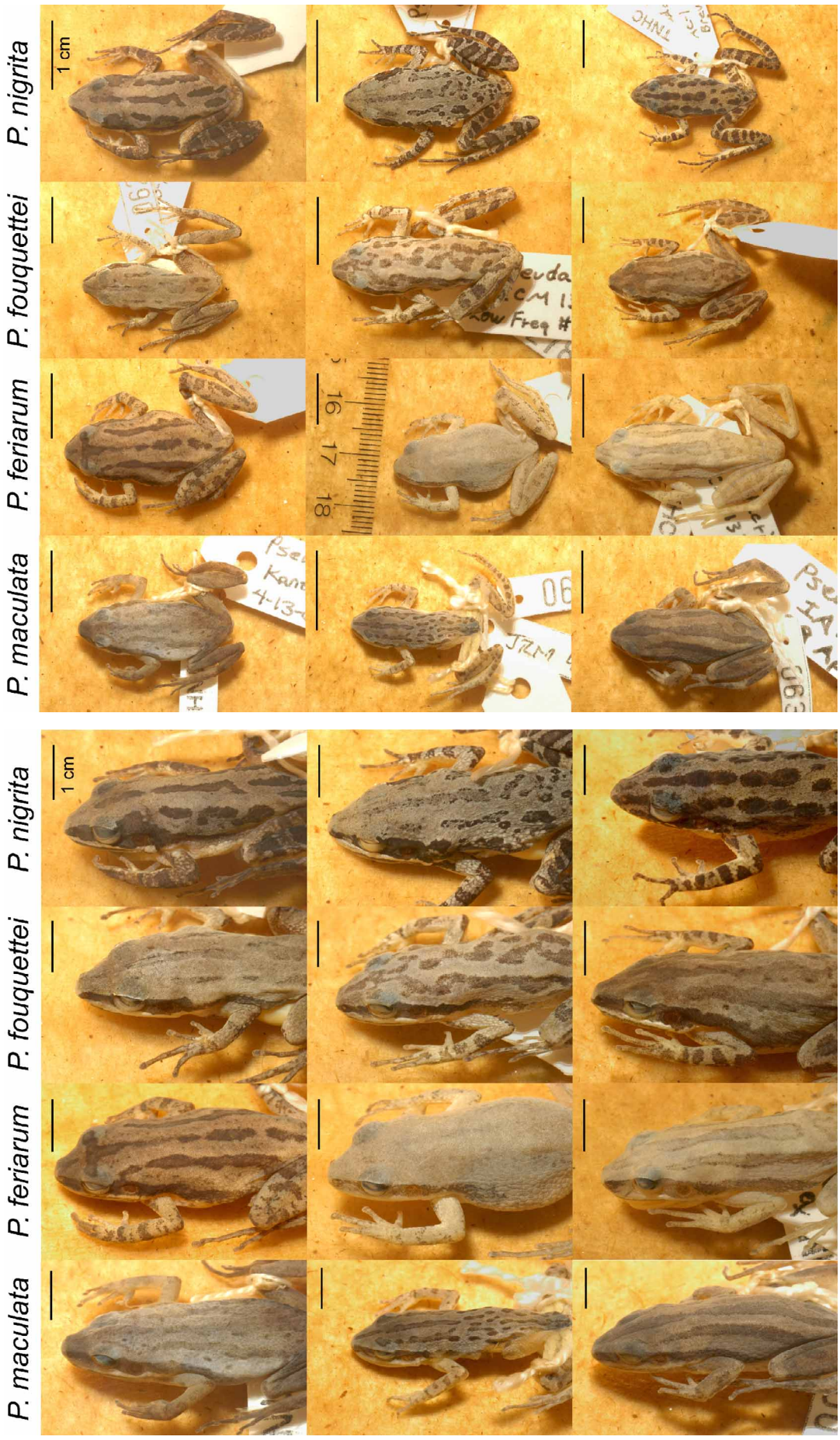

FIGURE 3. Photographs of *Pseudacris feriarum*, *P. fouquettei*, *P. maculata*, and *P. nigrita* in life. Specimens are described with localities and museum numbers from left to right: *P. nigrita*: Calhoun Co., Florida TNHC 63211 and Barnwell Co., South Carolina TNHC 62205; *P. fouquettei*: Marion Co., Mississippi TNHC 63600 and Craighead Co., Arkansas TNHC 62259; *P. feriarum*: Calhoun Co., Florida TNHC 63319 and Johnson Co., North Carolina TNHC 63564; *P. maculata*: Fillmore Co., Minnnesota TNHC 63612 and Douglas Co., Kansas TNHC 62378. Photos by EML except TNHC 63612 was photographed by Suzanne L. Collins.

Pseudacris fouquettei can be distinguished from three broadly sympatric chorus frogs in the south-central United States using color pattern, morphology, and the terminal discs on the digits. *Pseudacris crucifer* typically has an "X" pattern on the dorsal surface, larger terminal discs, and is more arboreal. *Pseudacris streckeri* is larger and heavier-bodied and lacks terminal discs. In addition, both of these species have unpulsed single-note advertisement calls compared to the pulsed call of *P. fouquettei*. *Pseudacris clarkii* typically has green spots or stripes on the dorsal surface, an interorbital triangle, and produces a much faster pulse-rate call (Conant and Collins 1998; E. Moriarty Lemmon, unpub. data).

Pseudacris fouquettei can also be distinguished from three taxa with parapatric distributions: *P. feriarum*, *P. maculata*, and *P. nigrita* (Fig. 1; Lemmon *et al.* 2007b). Genetic data show that *Pseudacris fouquettei* is not closely related to the species in which it was formerly included (*P. feriarum*) or to *P. maculata* or *P. triseriata*. The new species instead forms the sister clade to *P. nigrita* (Fig. 8; Lemmon *et al.* 2007b). *Pseudacris fouquettei* (referred to as *P. triseriata feriarum* by Gartside [1980]) is known to hybridize with *P. nigrita* in a narrow <20 km zone in the Pearl River floodplain along the border between Louisiana and Mississippi (Gartside 1980). The two species are fixed for alternative alleles at two or more allozyme loci outside the hybrid zone, however, indicating species-specific differences between these taxa (Gartside 1980). In addition, these taxa differ at 38 diagnostic SNPs in the 12S/16S mitochondrial gene region (27 *P. fouquettei* and 17 *P. nigrita* were examined; Lemmon *et al.* 2007b). Average pairwise sequence divergence between the two species is comparable to genetic distances of other *Pseudacris* species pairs (Fig. 8; GTR+G+I corrected p-distances for the 12S/16S mitochondrial region, with parameter settings derived from the mean of the posterior distribution from the Lemmon *et al*. [2007b] Bayesian analysis). *Pseudacris fouquettei* and *P. nigrita* also show a sharp cline in color pattern across this contact zone and are easily distinguished using this character outside of the zone (Gartside 1980; EML unpub. data).

Advertisement call data indicate that *P. fouquettei* differs from the three parapatric species with respect to several variables. The new species has a slower call rate than *P. feriarum* and *P. maculata* (0.34±0.06 s.d. vs. 0.49±0.05 and 0.42±0.07 calls/sec, respectively), a higher call duty cycle than *P. nigrita* (0.36±0.05 vs.0.31±0.04), a longer call length than all three species (1115.42±150.34 vs. 745.95±79.25, 906.56±127.48, and 892.73±106.43 ms, respectively), and an intermediate pulse number between *P. feriarum*, *P. maculata*, and *P. nigrita* (13.07±1.63 vs. 17.04±2.25, 17.09±1.64 and 9.56±1.67, respectively). There is broad overlap among species with regard to dominant frequency (Figs. 4–5; Table 1).

TABLE 1. Variation in advertisement calls of four species of *Pseudacris*. Five call characters (with units where appropriate) are listed as follows: dominant frequency (DF, Hz), call duty cycle (CDC), call length (CL, ms), call rate (CR, calls per sec), and pulse number (PN). Data include the sample size (*n*), mean for each variable ± 1 standard deviation, with range shown below. Two variables (CL and CR) have been corrected to a common temperature of 14°C.

	Holotype	*P. fouquettei* (*n*=26)	*P. feriarum* (*n*=19)	*P. nigrita* (*n*=19)	*P. maculata* (n=15)
DF	3273.05	3138.80±205.79	2952.28±312.93	3044.63±156.84	3078.81±135.96
		2845.97–3712.94	2583.98–3583.74	2767.02–3294.58	2855.63–3283.81
CDC	0.37	0.36±0.05	0.38±0.05	0.31±0.04	0.37±0.04
		0.26–0.44	0.31–0.49	0.25–0.40	0.31–0.44
CL	910.31	1115.42±150.34	745.95±79.25	906.56±127.48	892.73±106.43
		867.15–1554.53	599.08–908.53	701.39–1161.68	728.39–1183.05
CR	0.41	0.34±0.06	0.49±0.05	0.34±0.05	0.42±0.07
		0.14–0.43	0.42–0.59	0.26–0.46	0.24–0.55
PN	13.50	13.07±1.63	17.04±2.25	9.56±1.67	17.09±1.64
		9.93–15.69	12.45–22.43	6.40–12.92	13.45–20.00

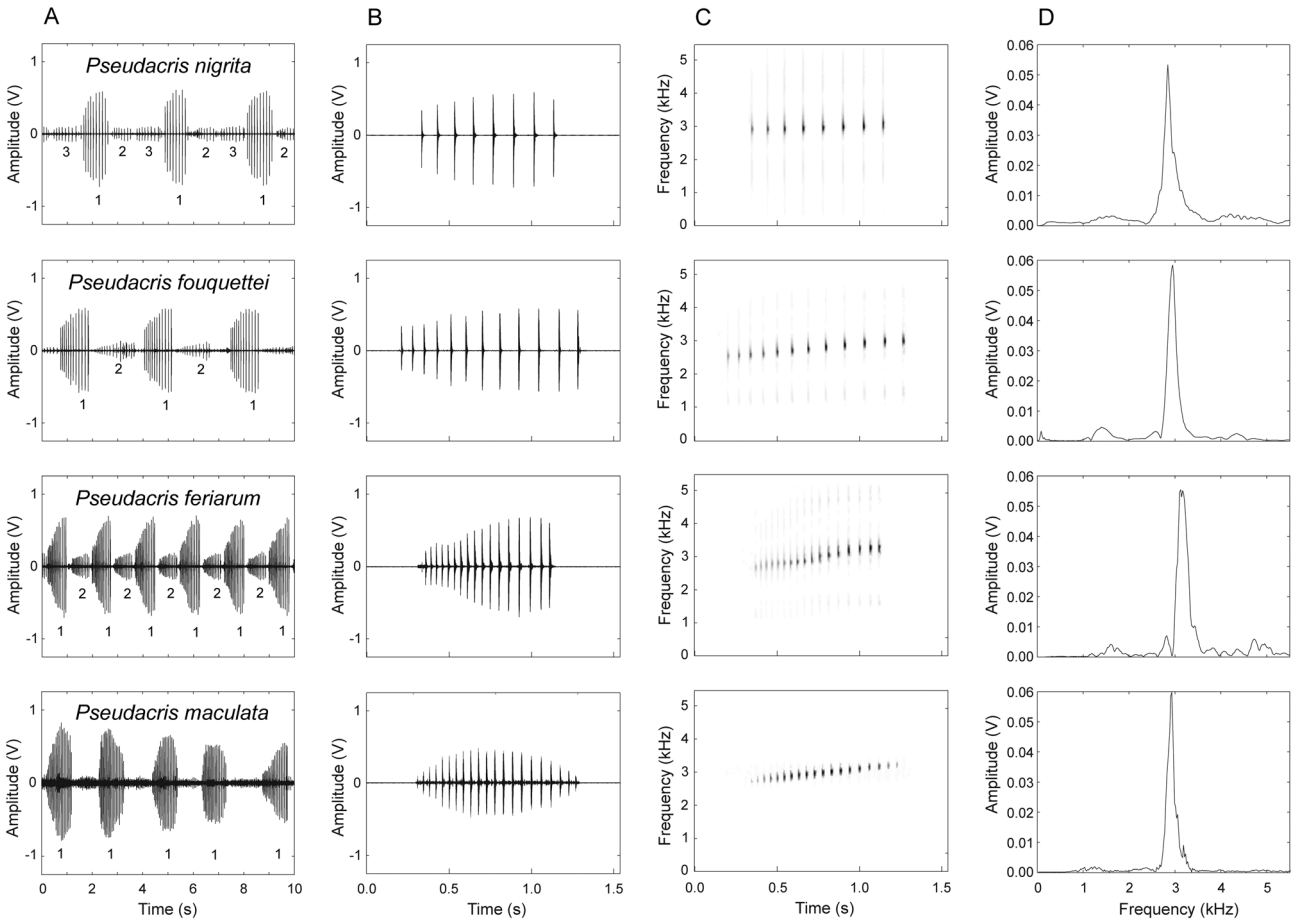

FIGURE 4. Advertisement calls of *Pseudacris nigrita* (first row), *P. fouquettei* (second row), *P. feriarum* (third row), and *P. maculata* (fourth row). Individuals were recorded within ~2°C of each other at 11.6, 12.6, 13.8, and 11.7°C, respectively. Oscillograms (10 sec and 1.5 sec) are shown in columns A and B, spectrograms in column C, and power spectra in column D. Numbered calls in A indicate different individuals calling in sequence. A single call is represented in B–D. Units are as follows: amplitude (volts), time (seconds), and frequency (kilohertz).

Principal component analyses of call variables indicate that *P. fouquettei* does not overlap with *P. feriarum* along PCI (explains 47% of variance), which has high loadings of call rate and pulse number. The new species overlaps to a small degree with *P. maculata* and to a greater degree with *P. nigrita* along this axis. *Pseudacris fouquettei* overlaps with all three species along PCII (explains 27% of variance), which has high loadings of call duty cycle and call length (Fig. 6; Table 2).

In congruence with previous studies, *Pseudacris fouquettei* overlaps morphologically with the parapatric taxa *P. feriarum* and *P. nigrita*. These three species are morphologically distinct from their more distant relative, *P. maculata*, with respect to head width, head length, eye width, tibia length, and femur length (Fig. 7). *Pseudacris fouquettei* is more similar to its sister species, *P. nigrita*, in terms of head width and femur length, more similar to *P. feriarum* with regard to head length, intermediate between the two species with respect to snout angle and foot length, and nearly identical to both species in terms of snout length, eye width, tympanum diameter, and tibia-fibula length (Fig. 7; Table 3).

Multivariate analyses of morphometric data indicate that *P. fouquettei* is essentially identical to *P. feriarum* and *P. nigrita* along PC1 (explains 53% of variance), which is dominated by head size and leg length variables. The three species are distinct from *P. maculata* along this axis. *Pseudacris fouquettei* is intermediate between *P. feriarum* and *P. nigrita*, however, along PC2 (explains 18% of variance), which is dominated by snout angle and foot length (Fig. 6; Table 4).

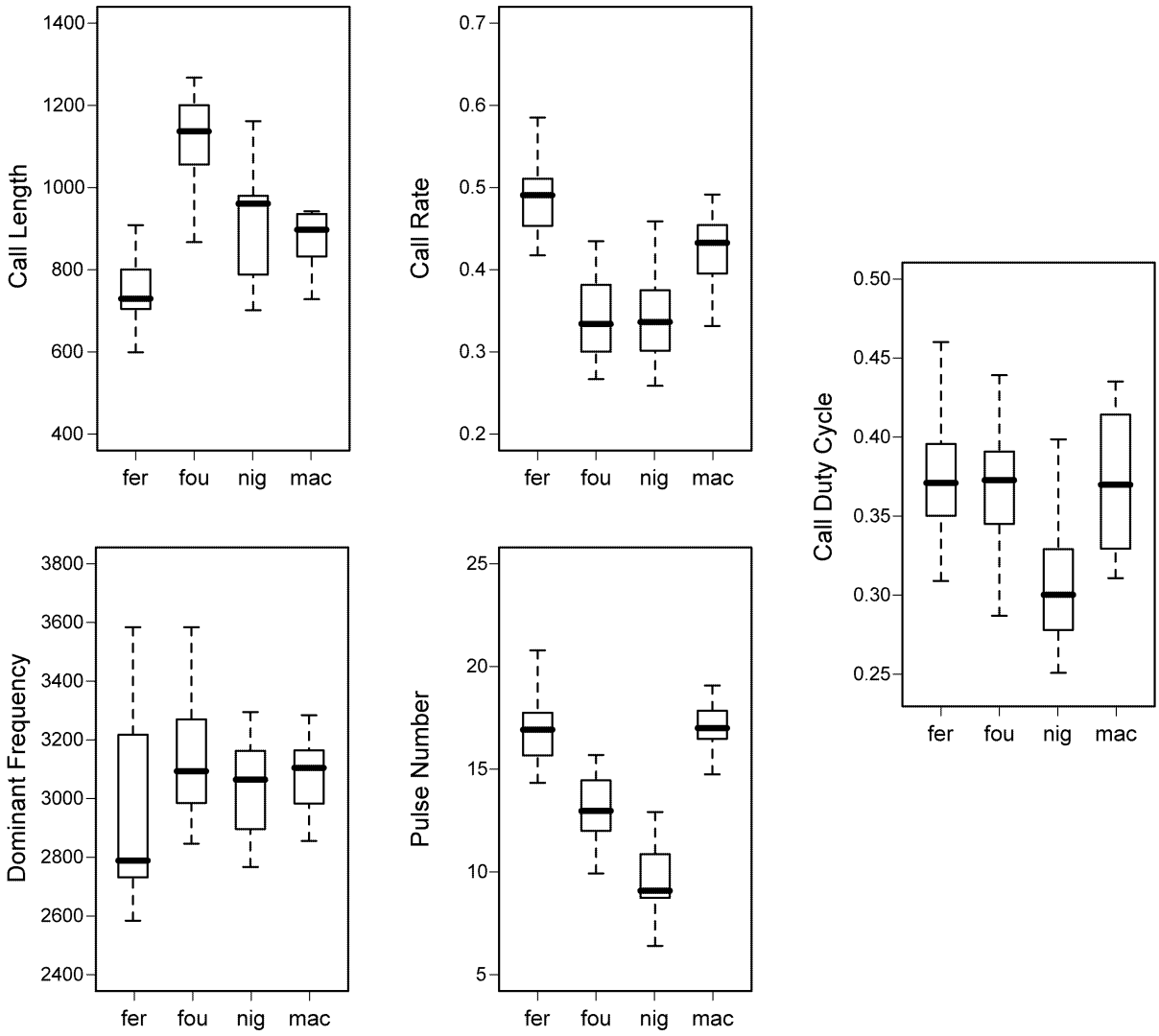

FIGURE 5. Box and whisker plots (median = central black bar, boxes = 25th–75th quartiles, whiskers = maximum and minimum values after excluding outliers) showing advertisement call variation among *Pseudacris fouquettei* (fou), *P. feriarum* (fer), *P. nigrita* (nig), and *P. maculata* (mac). Five variables are presented: call rate, call length, dominant frequency, pulse number, and call duty cycle. Individuals analyzed are listed in Appendix 2.

TABLE 2. Loadings for the first four principal components from the multivariate analysis of advertisement call variables.

	I	II	III	IV
DF	-0.267	0.377	0.867	0.187
CDC	0.426	0.583	-0.024	-0.502
CL	-0.352	0.652	-0.370	-0.053
CR	0.600	-0.107	0.304	-0.274
PN	0.513	0.286	-0.138	0.797
Eigenvalues	2.327	1.338	0.838	0.412
Percent of Variance	46.538	26.757	16.753	8.245
Cumulative Percent	46.538	73.294	90.047	98.292

TABLE 3. Morphometric variation of four species of *Pseudacris*. Ten raw morphometric variables are listed as follows (in mm, except as noted): snout-urostyle length (SVL), snout angle (SA, radians), head width (HW), head length (HL), tympanum diameter (TD), eye width (EW), snout length (Snout), femur length (FeL), tibia length (TL), and foot length (FoL). Data include the sample size (*n*), mean for each variable ± standard deviation and range. Note that the data below are the raw variables, whereas the residuals are shown in Fig. 7. Populations and individuals examined from each species are listed in Appendix 1.

	Holotype	*P. fouquettei* (*n*=117)	*P. feriarum* (*n*=202)	*P. nigrita* (*n*=78)	*P. maculata* (*n*=74)
SVL	27.38	26.39±1.71	25.54±1.90	25.73±1.75	24.35±2.80
		22.20–29.79	19.98–30.28	21.26–29.50	19.95–30.56
SA	1.04	0.99±0.05	1.02±0.06	0.96±0.05	0.96±0.06
		0.84–1.13	0.81–1.20	0.86–1.08	0.79–1.11
HW	9.30	8.72±0.63	8.81±0.63	8.56±0.61	7.36±1.07
		7.01–10.14	6.67–10.18	6.80–10.15	5.34–10.03
HL	9.36	9.17±0.54	9.07±0.62	9.27±0.57	7.99±0.99
		7.74–10.44	7.36–10.73	7.97–10.70	6.28–10.21
TD	1.72	1.34±0.20	1.36±0.20	1.30±0.13	1.22±0.23
		0.77–1.80	0.81–1.83	1.01–1.62	0.87–1.81
EW	3.07	2.88±0.25	2.91±0.27	2.93±0.23	2.48±0.29
		2.18–3.55	2.23–3.65	2.35–3.55	1.92–3.18
Snout	2.29	2.48±0.25	2.41±0.26	2.49±0.24	2.17±0.33
		1.86–2.97	1.64–3.05	1.94–3.16	1.32–2.95
FeL	13.14	11.69±0.94	11.96±1.02	11.68±0.86	9.75±1.46
		9.38–14.18	9.33–14.74	9.38–13.68	7.73–13.44
TL	14.07	13.08±0.91	13.05±1.04	12.87±0.98	10.14±1.50
		10.97–15.11	10.42–15.37	10.82–15.06	8.08–13.50
FoL	13.60	12.87±0.92	12.21±1.04	12.94±1.08	11.60±1.59
		10.14–14.85	9.84–15.17	10.54–15.54	8.97–15.36

TABLE 4. Loadings for the first four principal components from the multivariate analysis of morphometric variables.

	I	II	III	IV
Residual HW	0.419	-0.225	-0.106	-0.201
Residual HL	0.393	0.206	-0.205	0.061
Residual TD	0.191	-0.298	0.699	0.536
Residual EW	0.311	0.111	-0.361	0.620
Residual SL	0.318	0.281	0.448	-0.144
Residual FeL	0.408	-0.096	-0.169	-0.143
Residual TL	0.421	0.013	-0.104	0.045
Residual FoL	0.191	0.616	0.284	-0.283
Residual SA	0.237	-0.582	0.085	-0.402
Eigenvalues	4.757	1.590	0.934	0.653
Percent of Variance	52.853	17.667	10.376	7.253
Cumulative Percent	52.853	70.520	80.896	88.150

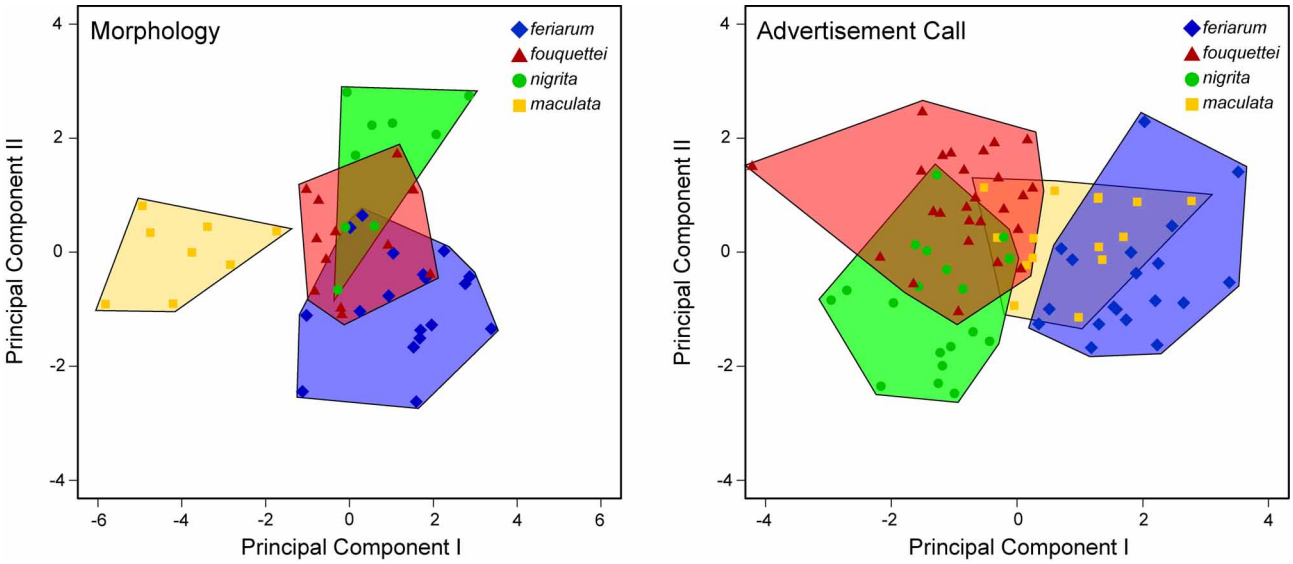

FIGURE 6. Multivariate variation in morphology and advertisement calls within and among *Pseudacris feriarum*, *P. fouquettei*, *P. maculata*, and *P. nigrita* along the first two principal component axes. Representatives of each species are enclosed by polygons. Analyses of morphological data were based on the nine variables in Fig. 7. Analyses of call data were based on the five variables in Fig. 5. Prior to analysis, morphological variables were averaged by population, such that each point on the graph represents a population. In contrast, points on the advertisement call graph represent individuals.

The color pattern of *P. fouquettei* closely resembles that of *P. feriarum* in terms of the three longitudinal stripes along the dorsal surface, although there is high inter-population variation in this character (Fig. 3). *Pseudacris fouquettei* can be easily distinguished from *P. nigrita*, however, based on color pattern. The latter species has generally darker markings including a broken stripe or spotted pattern on the dorsal surface and wider, darker (tending to black), transverse bars on the legs (Figs. 2 and 3).

Description: Male *Pseudacris fouquettei* attain a maximum snout-vent length of 30 mm, and females reach at least 27 mm. The head is slightly narrower than the body, and the top of the head is barely convex. In dorsal profile, the snout is acuminate and in ventral profile, it projects well beyond the tip of the lower jaw. The snout is long with slightly protuberant nostrils situated at a point about two-thirds of the distance from the anterior corner of the eye to the tip of the snout. The eyes are of moderate size and not protuberant. The canthus rostralis is rounded, and the loreal region is barely concave; the lips are moderately thick and not flared. A thin supratympanic fold extends posteriorly from the eye, above the tympanum, and downward to a point above the insertion of the arm. The fold barely obscures the upper edge of the tympanum, which otherwise is distinct and separated from the eye by a distance equal to about two-thirds of the diameter of the tympanum.

The arms are moderately long and robust; an axillary membrane is absent. A slight ulnar fold is present, with no rows of tubercles, and a distinct dermal fold is present on the dorsal surface of the wrist. The fingers are long and slender and bear discs that are only slightly wider than the fingers. The subarticular tubercles are moderately large and round, and none are bifid. The supernumerary tubercles are absent. A large almost bifid palmar tubercle is present. The prepollex is not enlarged and in breeding males does not bear a nuptial excrescence. No webbing is present on the hands. The legs are of moderate length and slender. A well-developed, flaplike inner tarsal fold extends the full length of the tarsus and connects to the inner metatarsal tubercle. An outer tarsal fold is lacking. The inner metatarsal tubercle is small, elliptical, and elevated. A smaller, conical outer metatarsal tubercle is present. The toes are long and slender; the small toe discs are slightly wider than the digits. The subarticular tubercles are large, round, and flattened in profile. A few supernumerary tubercles are barely evident on the proximal segments of the outer digits. The toes are webbed only basally between digits III and IV and between IV and V.

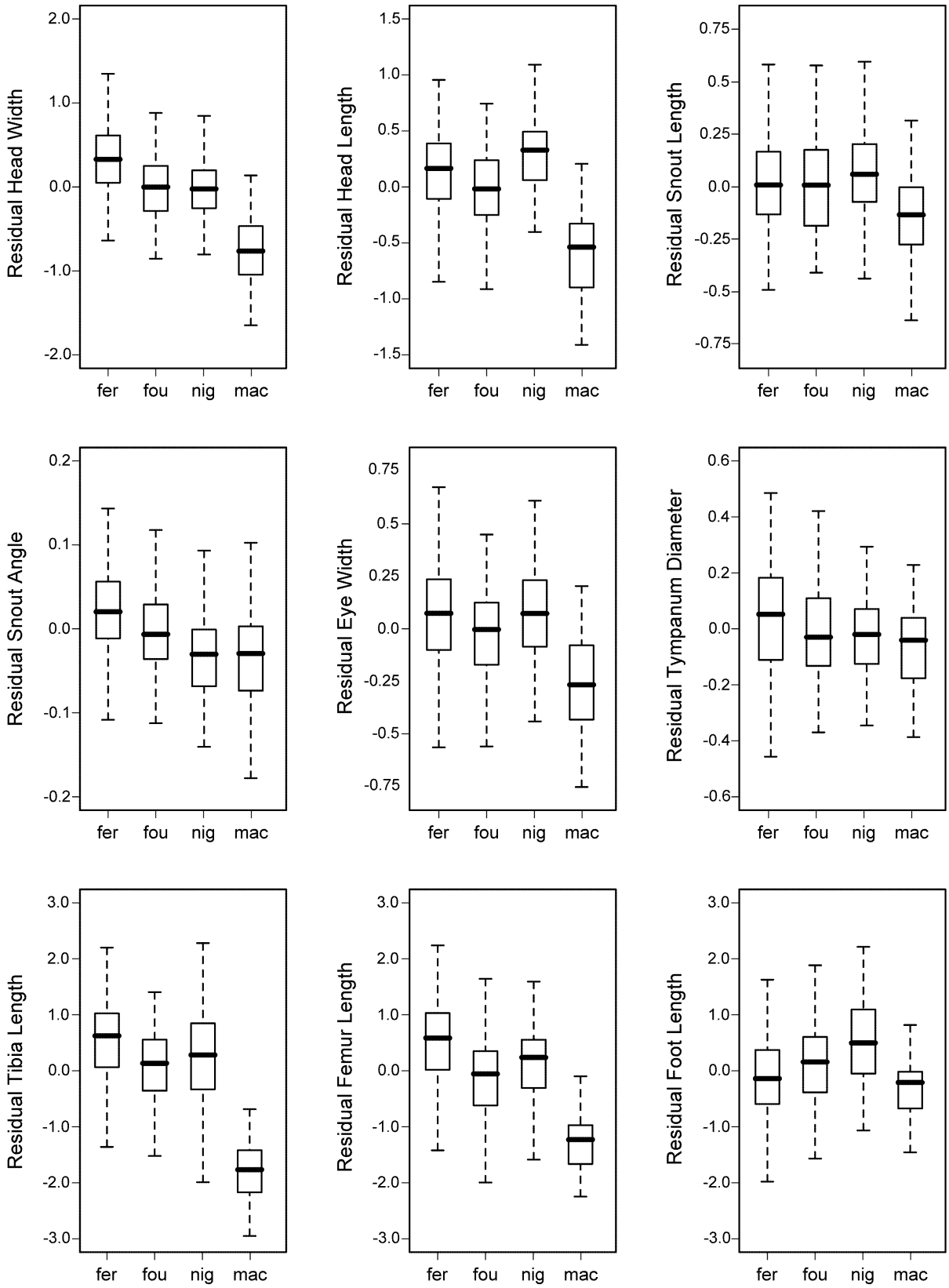

FIGURE 7. Box and whisker plots (median = central black bar, boxes = 25th–75th quartiles, whiskers = maximum and minimum values after excluding outliers) showing morphological variation among *Pseudacris fouquettei* (fou), *P. feriarum* (fer), *P. nigrita* (nig), and *P. maculata* (mac). Nine variables are presented: residual head width, residual head length, residual snout length, residual snout angle, residual eye width, residual tympanum diameter, residual tibia-fibula length, residual femur length, and residual foot length. Individuals analyzed are listed in Appendix 1.

The cloacal opening is directed posteriorly near the mid level of the thighs; a short transverse flap lies dorsal to the opening, and partially covers it. The skin on the dorsum is weakly granular, whereas that on the venter is strongly granular. The tongue is cordiform, shallowly notched posteriorly, and barely free behind. The dentigerous processes of the vomers are small rounded elevations that are widely separated medially and lie between the ovoid choanae. Two or three teeth are present on each process. The short elliptical vocal slits extend along the posterior two-thirds of the tongue to the angle of the jaws. The vocal sac is single, median, subgular, and greatly distensible.

Measurements of holotype: Adult male, morphometric data: SVL 27.38; SA 1.04; HW 9.30; HL 9.36; TD 1.72; EW 3.07; Snout 2.29; FeL 13.14; TL 14.07; FoL 13.60 mm; advertisement call data: DF 3273.05 Hz; CDC 0.37; CL 910.31 ms; CR 0.41 calls per sec; PN 13.50; genetic data: mitochondrial haplotype of the *Pseudacris fouquettei* clade (Lemmon *et al.* 2007b).

Color in preservative: The general coloration of *Pseudacris fouquettei* is light brown above with three darker brown stripes or three sets of elongate spots forming rows on the back. The dorsal surface ranges from light gray to tan. The markings on the back and transverse bars on the limbs vary from medium to dark brown. There is a dark brown to reddish-brown stripe from the nostril to the eye, which extends to the mid or posterior flank region. A white to cream labial stripe is present, and extends beneath the eye to just posterior to the tympanum. The venter is creamy white and may have some brown flecking in the pectoral and mid abdominal region. The eye has a dark pupil with a bronze-gold iris.

Color in life: In life, the coloration is similar to that in preservative except the labial stripe is a bright iridescent white, the ground dorsal color may have a very slight pinkish hue, and the dorsal surface may have occasional brassy or gold flecking. Based on color photographs before preservation, paratypes TNHC 63471 and TNHC 63473 are tan to medium brown on the dorsal surface with three dark brown stripes that run longitudinally down the back of the frog. A broad dark reddish brown stripe runs laterally from the tip of the snout through the eye and tympanum to just anterior to the rear legs. A narrow bright white line runs laterally from the tip of the snout to the posterior end of the jaw just below the brown lateral stripe. Front and rear legs have dark brown transverse bars on a tan to medium brown background. The ventral surface is cream with several dark flecks. The throat is yellowish-brown.

Tadpoles: The tadpoles of this species have been described by Siekmann (1949; referred to as *Pseudacris triseriata feriarum*). Trauth *et al.* (2004) show multiple photographs of *P. fouquettei* tadpoles (referred to as *P. triseriata*) at different developmental stages.

Variation: There is marked variation in color pattern types in our sample of twelve *Pseudacris fouquettei* from the type locality (East Baton Rouge Parish, Louisiana). Four exhibit a strong three-stripe pattern on the dorsal surface (TNHC 62267, 63471, 63477, and 63478), two show a three-stripe pattern with dark dots bounding the stripes (TNHC 63473 and 63475), four show a broken three-stripe pattern (TNHC 62265, 62266, 63472, and 63479), and two are patternless, except for markings on the legs (TNHC 63474 and 63476). An interorbital triangle is not present in any specimens. Dark transverse bars are present on the legs and vary in number from 2 to 15 among specimens. A dark brown stripe runs laterally from anterior to the nares to mid-flank, and a white labial stripe is present on all specimens. The ventral surfaces are generally cream, but some specimens have venters with scattered flecks of gray pigment. The vocal sac area is yellowish-orange with dark gray pigment (in males).

Other *Pseudacris fouquettei* populations are similar in color pattern, except that the stripe pattern is more consistent. In ten specimens from Craighead Co., Arkansas, all except one exhibit the solid three-stripe pattern (TNHC 62255–62264, not TNHC 62259, which shows a faint broken-stripe pattern). In twelve specimens from Newton Co., Texas, all specimens show a strong three-stripe pattern (TNHC 20691–20696 and TNHC 20698–20704; Appendix 1).

Ecology and natural history: *Pseudacris fouquettei* is a winter or early spring breeder that can be heard chorusing in temporary bodies of water from January to May. Breeding activity depends on amenable temper-

atures (4°C to 21°C; nocturnal temperature of 10–18°C is optimal) and recent rainfall. *Pseudacris fouquettei* congregate to breed in ephemeral pools and ponds in a variety of habitats, ranging from forested areas to open fields. The species has successfully colonized wet roadside ditches throughout its range. Little is known about the activity of the species outside of the breeding season. Frogs disperse from breeding sites and presumably forage on small invertebrates like other trilling chorus frogs (Whitaker 1971) and range within an area of about 200 m from the breeding pool (Kramer 1973, 1974). *Pseudacris fouquettei* is not ecologically limited to pine forest, as is its sister species, *P. nigrita*. Rather, the new species appears to tolerate a much broader range of environmental conditions.

Distribution: *Pseudacris fouquettei* is distributed along the coast of the Gulf of Mexico from western Mississippi, Louisiana, and eastern Texas north to eastern Oklahoma (nearly to Kansas), Arkansas, and barely into southern Missouri (Fig. 1; Lemmon *et al.* 2007b).

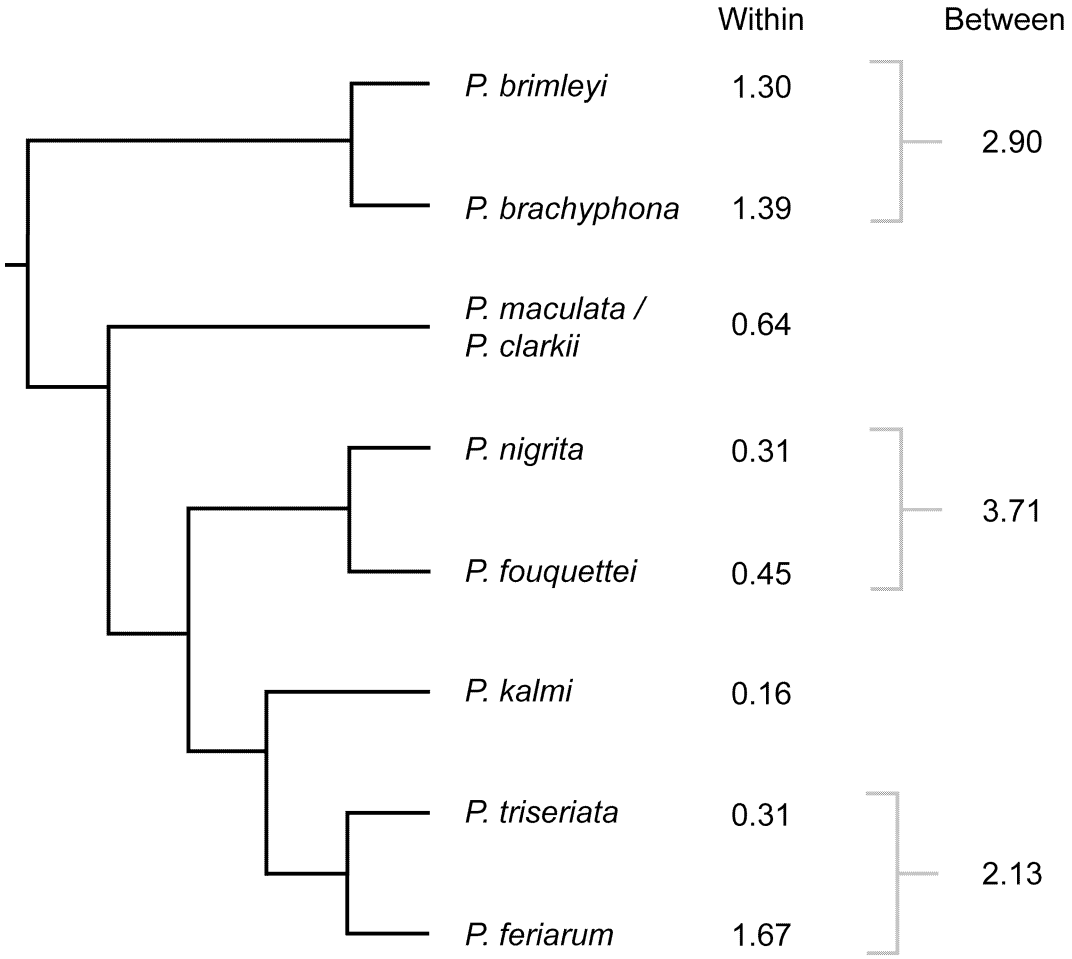

FIGURE 8. Phylogeny of the trilling chorus frogs (clade within *Pseudacris*) based on Lemmon *et al.* (2007b). Also shown are within- and between-species average pairwise genetic distances (GTR+G+I corrected p-distances) for the 12S/16S mitochondrial region, expressed as percentages. *Pseudacris maculata* and *P. clarkii* are represented with a single branch because these species are not reciprocally monophyletic.

Discussion

The description of *Pseudacris fouquettei* brings the currently recognized number of species in *Pseudacris* to 17 (Moriarty and Cannatella 2004; Recuero *et al.* 2006; Lemmon *et al.* 2007b). Additional cryptic diversity may exist within several of these species, however, and further work must be done to determine whether the

degree of divergence among these lineages merits recognition at the species level. Addressing these questions using morphological data may not be the best approach, as demonstrated by this study. The strong morphological conservatism among the taxa examined here and among other species of trilling *Pseudacris* (EML, unpub. data) suggests stabilizing selection on an ecologically efficient body form (e.g., Wake *et al.* 1983), which therefore is not useful for distinguishing species. The more effective approach, supported by the data presented here, would be to examine the degree of fine-scale behavioral, ecological, and genetic differences among lineages.

We have shown evidence for clear differences between the advertisement calls of *Pseudacris fouquettei* and *P. feriarum*, despite the morphological similarity of these taxa. Future work should identify the characters of the acoustic signal (e.g., pulse rate, dominant frequency, etc.) that are salient to females during species recognition, through preference experiments. These data can be used to determine the degree of prezygotic isolation (partial or complete) between species. Additionally, more work needs to be done to identify the specific location of the contact zone between the two species. Our genetic work indicates that this contact occurs in central Mississippi (Fig. 1; Lemmon *et al.* 2007b), but further analysis of genetic and acoustic data must be conducted to determine the fine-scale boundaries.

As first indicated by Gartside (1980), strong genetic differences (both nuclear and mitochondrial) exist between *Pseudacris fouquettei* and its sister species *P. nigrita*. Hybridization does occur between these taxa in southeastern Louisiana and southern Mississippi. This hybrid zone is narrow both in depth and width relative to the distributions of the species. Additional work in the area by EML (unpub. data) found the area of the hybrid zone has not increased substantially during the 27 years since publication of Gartside (1980), suggesting that selection against hybrids is preventing formation of a hybrid swarm. Outside of the contact zone, the two species can be readily distinguished based on color pattern, and the two color-pattern groups are reciprocally monophyletic (Lemmon *et al*. 2007b). Within the hybrid zone, morphological intermediates may be found, representing first-generation and more advanced hybrids (Gartside 1980; EML, unpub. data).

Our data are consistent with the findings of Smith and Smith (1952), who found a steep morphological gradient between populations of *P. fouquettei* and *P. maculata* (referred to as *P. nigrita feriarum* and *P. n. triseriata*, respectively) in northern Oklahoma and northern Arkansas. Populations north of this region (*P. maculata*) have relatively smaller heads and shorter legs than populations to the south (*P. fouquettei*). It is unknown whether these two species hybridize in nature. If the degree of introgression is low or non-existent, however, these morphological characteristics should be useful for diagnosing species within as well as outside of the contact zone.

In summary, we describe, diagnose, and define a new species of chorus frog, *Pseudacris fouquettei*, based on behavioral, morphological, and genetic differences. This species is native to the south-central United States and is common throughout its distribution. Although previously confused with other chorus frogs, *P. fouquettei* can be distinguished in the field from sympatric species using color pattern and morphology and from parapatric species using advertisement calls, morphology, and color pattern. *Pseudacris fouquettei* is distinct from parapatric *P. feriarum* in terms of advertisement call, from *P. maculata* with respect to morphology, from *P. nigrita* with regard to color pattern, and from all species in terms of genetic data.

Acknowledgements

We would like to express our gratitude to biologists who assisted with data collection or provided field support: D. Beamer, J. Boundy, A. Braswell, S.L. Collins, E. Conrad, J. Delahoussaye, D.C. Forester, A.M. Heupel, C. Hobson, K. Irwin, J.B. Jensen, J. Knight, K. Knight, T. Lamb, M. McCallum, C.A. Moriarty, J.E. Petzing, C.A. Phillips, J. Poisson, A.H. Savitzky, B. Savitzky, T.W. Taggart, and O.Torres. We would also like to thank M.J. Fouquette for providing comments on an earlier version of this manuscript.

We are grateful to the following institutions for providing support during field research: Auburn University, East Carolina University, Florida Department of Environmental Protection, Grice Marine Laboratory, Old Dominion University, Southern Institute for Forest Genetics, and University of North Carolina, Chapel Hill.

We thank the following museums (and respective curators and collection managers) for providing access to specimens: Auburn University Natural History Museum (Craig Guyer, Roger Birkhead), Texas Natural History Collection (University of Texas, Austin, Travis LaDuc), Georgia Museum of Natural History (University of Georgia, Elizabeth McGhee), American Museum of Natural History (Darrel Frost, David Dickey), Carnegie Museum of Natural History (Stephen Rogers), Field Museum of Natural History (Alan Resetar, Harold Voris), Smithsonian National Museum of Natural History (Kevin de Queiroz), Museum of Vertebrate Zoology (University of California, Berkeley, Jim McGuire, Maria Tonione), University of Kansas Museum of Natural History (Rafe Brown, Linda Trueb, John Simmons), Arkansas State University Museum (Stanley Trauth), Louisiana Museum of Natural History (Louisiana State University, Baton Rouge, Christopher Austin), Sam Noble Oklahoma Museum (University of Oklahoma, Christina Wolfe), and Amphibian and Reptile Diversity Research Center (University of Texas, Arlington, Jonathan Campbell and Carl Franklin).

This work was supported by NSF Graduate Research Fellowships and NSF IGERT Fellowships in Computational Phylogenetics and Applications to Biology (DGE-0114387) to E. M. Lemmon and A. R. Lemmon, a Doctoral Dissertation Improvement Grant (0309309) to E. M. Lemmon under IACUC protocol #02112201, and NSF 9981631 to D. Cannatella.

References

Batts, B.S. (1960) Distribution of *Pseudacris nigrita nigrita* and *Pseudacris nigrita feriarum* in the Piedmont and Coastal Plain regions of North Carolina. *Herpetologica*, 16, 45–47.

Bee, M.A. (2004) Sound Ruler Acoustical Analysis: A free, open code, multi-platform sound analysis and graphic package. *Bioacoustics*, 14, 171–178.

Conant, R., & Collins, J.T. (1998) *Peterson Field Guide to Reptiles and Amphibians of Eastern and Central North America. Third Edition Expanded*. Houghton-Mifflin Company, Boston, 616 pp.

Crenshaw, J.W. & Blair, W.F. (1959) Relationships in the *Pseudacris nigrita* complex in southwestern Georgia. *Copeia*, 1959, 215–222.

Duellman, W.E. (2001) *Hylid Frogs of Middle America*. Society for the Study of Amphibians and Reptiles. Ithaca, New York, 1159 pp.

Frost, D.R. (2007) *Amphibian Species of the World: an Online Reference. Version 5.0*. American Museum of Natural History, New York, USA. Available from: http://research.amnh.org/herpetology/amphibia/index.php (accessed 30 October 2007).

Gartside, D.F. (1980) Analysis of a hybrid zone between chorus frogs of the *Pseudacris nigrita* complex in the southern United States. *Copeia*, 1980, 56–66.

Kramer, D.C. (1973) Movements of western chorus frogs *Pseudacris triseriata triseriata* tagged with Co^{60}. *Journal of Herpetology*, 7, 231–235.

Kramer, D.C. (1974) Home range of the western chorus frog *Pseudacris triseriata triseriata*. *Journal of Herpetology*, 8, 245–246.

Lemmon, E.M., Lemmon, A.R. & Cannatella, D.C. (2007a) Geological and climatic forces driving speciation in the continentally distributed trilling chorus frogs (*Pseudacris*). *Evolution*, 61, 2086–2103.

Lemmon, E.M., Lemmon, A.R., Lee-Yaw, J.A., Collins, J.T. & Cannatella, D.C. (2007b) Phylogeny-based delimitation of species boundaries and contact zones in the trilling chorus frogs (*Pseudacris*). *Molecular Phylogenetics and Evolution*, 44, 1068–1082.

Moriarty, E.C. & Cannatella, D.C. (2004) Phylogenetic relationships of the North American chorus frogs (*Pseudacris*: Hylidae). *Molecular Phylogenetics and Evolution*, 30, 409–420.

Neill, W.T. (1949) The status of Baird's chorus-frog. *Copeia*, 1949, 227–228.

Platz, J.E. & Forester, D.C. (1988) Geographic variation in mating call among the four subspecies of the chorus frog: *Pseudacris triseriata* (Wied). *Copeia*, 1988, 1062–1066.

Platz, J.E. (1989) Speciation within the chorus frog *Pseudacris triseriata*: Morphometric and mating call analyses of the

boreal and western subspecies. *Copeia*, 1989, 704–712.

Recuero, E., Martínez-Solano, I., Parra-Olea, G. & García-París, M. (2006) Phylogeography of *Pseudacris regilla* (Anura: Hylidae) in western North America, with a proposal for a new taxonomic rearrangement. *Molecular Phylogenetics and Evolution*, 39, 293–304.

Schwartz, A. (1957) Chorus frogs (*Pseudacris nigrita* LeConte) in South Carolina. *American Museum Novitates*, 1838, 1–12.

Siekmann, J.M. (1949) A survey of the tadpoles of Louisiana. Masters Thesis, Tulane University, New Orleans, 66 pp.

Smith, P.W. & Smith, D.M. (1952) The relationship of the chorus frogs, *Pseudacris nigrita feriarum* and *Pseudacris n. triseriata*. *American Midland Naturalist*, 48, 165–180.

Smith, P.W. (1956) The status, correct name, and geographic range of the boreal chorus frog. *Proceedings of the Biological Society of Washington*, 69, 169–176.

Smith, S.A., Stephens, P.R. & Wiens, J.J. (2005) Replicate patterns of species richness, historical biogeography, and phylogeny in Holarctic treefrogs. *Evolution*, 59, 2433–2450.

Trauth, S.E., Robison, H.W. & Plummer, M.V. (2004) *The Amphibians and Reptiles of Arkansas*. University of Arkansas Press, Fayetteville, 417 pp.

Wake, D.B., Roth, G. & Wake, M.H. (1983) On the problem of stasis in organismal evolution. *Journal of Theoretical Biology*, 101, 211–224.

Whitaker, J.O. (1971) A study of the western chorus frogs, *Pseudacris triseriata*, in Vigo County, Indiana. *Journal of Herpetology*, 5, 127–150.

Appendix 1. List of *Pseudacris* measured for morphometric data

Updated species names according to Lemmon *et al.* (2007b) are shown (except *P.* **sp. nov.** from that paper is now listed as *P. fouquettei*). Specimens were examined from the following museums: Auburn University Natural History Museum (AUM), Texas Natural History Collection, University of Texas, Austin (TNHC), Georgia Museum of Natural History, University of Georgia (GMNH), American Museum of Natural History, New York (AMNH), Carnegie Museum of Natural History, Pittsburgh, Pennsylvania (CM), Field Museum of Natural History, Chicago, Illinois (FMNH), Smithsonian National Museum of Natural History, Washington D.C. (USNM), Museum of Vertebrate Zoology, University of California, Berkeley (MVZ), University of Kansas Museum of Natural History, Lawrence (KU), Arkansas State University Museum, Jonesboro (ASUM), Louisiana Museum of Natural History, Louisiana State University (LSU), Sam Noble Oklahoma Museum, University of Oklahoma (OMNH), and Amphibian and Reptile Diversity Research Center, University of Texas, Arlington (UTA). Localities are listed by county and state. More detailed locality data can be downloaded from the HerpNet website (www.herpnet.org/) or obtained directly from the respective museums. Population refers to the groups designated for the principal component analysis of morphometric data (data were averaged by population prior to analysis).

Updated Species Name	Museum	Catalog No.	County	State	Population
P. feriarum	AUM	4381	Barbour	Alabama	2
P. feriarum	AUM	4385	Barbour	Alabama	2
P. feriarum	AUM	4387	Barbour	Alabama	2
P. feriarum	AUM	4390	Barbour	Alabama	2
P. feriarum	AUM	4392	Barbour	Alabama	2
P. feriarum	AUM	4393	Barbour	Alabama	2
P. feriarum	AUM	4394	Barbour	Alabama	2
P. feriarum	AUM	4493	Barbour	Alabama	2
P. feriarum	AUM	7546	Barbour	Alabama	2
P. feriarum	AUM	29673	Barbour	Alabama	2
P. feriarum	AUM	29675	Barbour	Alabama	2
P. feriarum	AUM	29679	Barbour	Alabama	2
P. feriarum	AUM	16643	Calhoun	Alabama	3
P. feriarum	AUM	16647	Calhoun	Alabama	3
P. feriarum	AUM	21919	Calhoun	Alabama	3
P. feriarum	AUM	21899	Cherokee	Alabama	3
P. feriarum	AUM	21900	Cherokee	Alabama	3
P. feriarum	AUM	21901	Cherokee	Alabama	3
P. feriarum	AUM	21902	Cherokee	Alabama	3
P. feriarum	AUM	21903	Cherokee	Alabama	3
P. feriarum	AUM	11849	Cleburne	Alabama	3
P. feriarum	AUM	21896	Etowah	Alabama	3
P. feriarum	AUM	21897	Etowah	Alabama	3
P. feriarum	AUM	21898	Etowah	Alabama	3
P. feriarum	AUM	7713	Colbert	Alabama	5
P. feriarum	AUM	19455	Colbert	Alabama	5
P. feriarum	AUM	19588	Colbert	Alabama	5
P. feriarum	AUM	19590	Colbert	Alabama	5
P. feriarum	AUM	22092	Colbert	Alabama	5
P. feriarum	AUM	22093	Colbert	Alabama	5
P. feriarum	AUM	22094	Colbert	Alabama	5

P. feriarum	AUM	22095	Colbert	Alabama	5
P. feriarum	AUM	22096	Colbert	Alabama	5
P. feriarum	AUM	22097	Colbert	Alabama	5
P. feriarum	AUM	33104	Colbert	Alabama	5
P. feriarum	AUM	33106	Colbert	Alabama	5
P. feriarum	TNHC	63124	Macon	Alabama	11
P. feriarum	TNHC	63125	Macon	Alabama	11
P. feriarum	TNHC	63126	Macon	Alabama	11
P. feriarum	TNHC	63127	Macon	Alabama	11
P. feriarum	TNHC	63128	Macon	Alabama	11
P. feriarum	TNHC	63129	Macon	Alabama	11
P. feriarum	TNHC	63130	Macon	Alabama	11
P. feriarum	TNHC	63131	Macon	Alabama	11
P. feriarum	TNHC	63132	Macon	Alabama	11
P. feriarum	TNHC	63455	Macon	Alabama	11
P. feriarum	TNHC	63456	Macon	Alabama	11
P. feriarum	TNHC	63457	Macon	Alabama	11
P. feriarum	AUM	11148	Monroe	Alabama	13
P. feriarum	AUM	11149	Monroe	Alabama	13
P. feriarum	AUM	11150	Monroe	Alabama	13
P. feriarum	AUM	11151	Monroe	Alabama	13
P. feriarum	AUM	11152	Monroe	Alabama	13
P. feriarum	AUM	11153	Monroe	Alabama	13
P. feriarum	AUM	11154	Monroe	Alabama	13
P. feriarum	AUM	11168	Monroe	Alabama	13
P. feriarum	AUM	11170	Monroe	Alabama	13
P. feriarum	AUM	11171	Monroe	Alabama	13
P. feriarum	AUM	11172	Monroe	Alabama	13
P. feriarum	AUM	11173	Monroe	Alabama	13
P. feriarum	AUM	21912	Chilton	Alabama	17
P. feriarum	AUM	21913	Chilton	Alabama	17
P. feriarum	AUM	21915	Chilton	Alabama	17
P. feriarum	AUM	3324	Shelby	Alabama	17
P. feriarum	AUM	3326	Shelby	Alabama	17
P. feriarum	AUM	3328	Shelby	Alabama	17
P. feriarum	AUM	3330	Shelby	Alabama	17
P. feriarum	AUM	3331	Shelby	Alabama	17
P. feriarum	AUM	3332	Shelby	Alabama	17
P. feriarum	AUM	3333	Shelby	Alabama	17
P. feriarum	AUM	3334	Shelby	Alabama	17
P. feriarum	AUM	3335	Shelby	Alabama	17
P. feriarum	GMNH	10994	Coweta	Georgia	6
P. feriarum	GMNH	10995	Coweta	Georgia	6
P. feriarum	GMNH	10996	Coweta	Georgia	6

P. feriarum	GMNH	10997	Coweta	Georgia	6
P. feriarum	GMNH	10998	Coweta	Georgia	6
P. feriarum	GMNH	19234	Coweta	Georgia	6
P. feriarum	GMNH	10850	Meriwether	Georgia	6
P. feriarum	GMNH	10851	Meriwether	Georgia	6
P. feriarum	GMNH	10853	Meriwether	Georgia	6
P. feriarum	GMNH	11052	Meriwether	Georgia	6
P. feriarum	GMNH	11053	Meriwether	Georgia	6
P. feriarum	GMNH	11054	Meriwether	Georgia	6
P. feriarum	AMNH	A109153	Richmond	Georgia	12
P. feriarum	AMNH	A109154	Richmond	Georgia	12
P. feriarum	AMNH	A109155	Richmond	Georgia	12
P. feriarum	AMNH	A109156	Richmond	Georgia	12
P. feriarum	AMNH	A109208	Richmond	Georgia	12
P. feriarum	AMNH	A109209	Richmond	Georgia	12
P. feriarum	AMNH	A109210	Richmond	Georgia	12
P. feriarum	AMNH	A109212	Richmond	Georgia	12
P. feriarum	AMNH	A109213	Richmond	Georgia	12
P. feriarum	AMNH	A109214	Richmond	Georgia	12
P. feriarum	AMNH	A109215	Richmond	Georgia	12
P. feriarum	AMNH	A109216	Richmond	Georgia	12
P. feriarum	CM	55866	Howard	Maryland	10
P. feriarum	CM	55867	Howard	Maryland	10
P. feriarum	CM	55871	Prince Georges	Maryland	10
P. feriarum	CM	55872	Prince Georges	Maryland	10
P. feriarum	CM	55876	Prince Georges	Maryland	10
P. feriarum	CM	55890	Prince Georges	Maryland	10
P. feriarum	CM	55903c	Prince Georges	Maryland	10
P. feriarum	CM	55903g	Prince Georges	Maryland	10
P. feriarum	CM	55903l	Prince Georges	Maryland	10
P. feriarum	CM	55903o	Prince Georges	Maryland	10
P. feriarum	CM	55907g	Prince Georges	Maryland	10
P. feriarum	CM	55907k	Prince Georges	Maryland	10
P. feriarum	FMNH	193204	Oktibbeha	Mississippi	15
P. feriarum	FMNH	193206	Oktibbeha	Mississippi	15
P. feriarum	FMNH	193207	Oktibbeha	Mississippi	15
P. feriarum	FMNH	193208	Oktibbeha	Mississippi	15
P. feriarum	FMNH	193209	Oktibbeha	Mississippi	15
P. feriarum	FMNH	193214	Oktibbeha	Mississippi	15
P. feriarum	FMNH	193215	Oktibbeha	Mississippi	15
P. feriarum	FMNH	193216	Oktibbeha	Mississippi	15
P. feriarum	FMNH	193217	Oktibbeha	Mississippi	15
P. feriarum	FMNH	193226	Oktibbeha	Mississippi	15
P. feriarum	FMNH	193227	Oktibbeha	Mississippi	15

P. feriarum	TNHC	62288	Chatham	North Carolina	4
P. feriarum	TNHC	62289	Chatham	North Carolina	4
P. feriarum	TNHC	62290	Chatham	North Carolina	4
P. feriarum	TNHC	62291	Chatham	North Carolina	4
P. feriarum	TNHC	62281	Wake	North Carolina	4
P. feriarum	TNHC	62283	Wake	North Carolina	4
P. feriarum	USNM	19630	Wake	North Carolina	4
P. feriarum	USNM	19631	Wake	North Carolina	4
P. feriarum	USNM	19633	Wake	North Carolina	4
P. feriarum	USNM	58087	Wake	North Carolina	4
P. feriarum	USNM	58088	Wake	North Carolina	4
P. feriarum	USNM	58089	Wake	North Carolina	4
P. feriarum	CM	29048	Adams	Pennsylvania	1
P. feriarum	CM	33581	Adams	Pennsylvania	1
P. feriarum	CM	33586	Adams	Pennsylvania	1
P. feriarum	CM	9955	Cumberland	Pennsylvania	1
P. feriarum	CM	9956	Cumberland	Pennsylvania	1
P. feriarum	CM	32067	Franklin	Pennsylvania	1
P. feriarum	CM	32068	Franklin	Pennsylvania	1
P. feriarum	CM	32069	Franklin	Pennsylvania	1
P. feriarum	CM	32070	Franklin	Pennsylvania	1
P. feriarum	CM	32071	Franklin	Pennsylvania	1
P. feriarum	CM	32072	Franklin	Pennsylvania	1
P. feriarum	CM	33622	Franklin	Pennsylvania	1
P. feriarum	CM	42352	Greenville	South Carolina	8
P. feriarum	CM	42353	Greenville	South Carolina	8
P. feriarum	CM	42355	Greenville	South Carolina	8
P. feriarum	CM	42356	Greenville	South Carolina	8
P. feriarum	CM	42357	Greenville	South Carolina	8
P. feriarum	CM	42358	Greenville	South Carolina	8
P. feriarum	CM	42359	Greenville	South Carolina	8
P. feriarum	CM	42360	Greenville	South Carolina	8
P. feriarum	CM	42361	Greenville	South Carolina	8
P. feriarum	CM	42362	Greenville	South Carolina	8
P. feriarum	CM	42363	Greenville	South Carolina	8
P. feriarum	CM	42534	Greenville	South Carolina	8
P. feriarum	CM	152406	Cumberland	Virginia	7
P. feriarum	CM	152436	Cumberland	Virginia	7
P. feriarum	CM	152437	Cumberland	Virginia	7
P. feriarum	CM	152445	Cumberland	Virginia	7
P. feriarum	CM	152472	Cumberland	Virginia	7
P. feriarum	CM	152473	Cumberland	Virginia	7
P. feriarum	CM	152645	Cumberland	Virginia	7
P. feriarum	AMNH	A122845	Montgomery	Virginia	14

P. feriarum	AMNH	A122846	Montgomery	Virginia	14
P. feriarum	AMNH	A122848	Montgomery	Virginia	14
P. feriarum	AMNH	A122849	Montgomery	Virginia	14
P. feriarum	AMNH	A122850	Montgomery	Virginia	14
P. feriarum	AMNH	A122851	Montgomery	Virginia	14
P. feriarum	AMNH	A122852	Montgomery	Virginia	14
P. feriarum	AMNH	A122854	Montgomery	Virginia	14
P. feriarum	AMNH	A122855	Montgomery	Virginia	14
P. feriarum	AMNH	A122856	Montgomery	Virginia	14
P. feriarum	AMNH	A122857	Montgomery	Virginia	14
P. feriarum	AMNH	A122859	Montgomery	Virginia	14
P. feriarum	CM	55966	Rockingham	Virginia	16
P. feriarum	CM	55967	Rockingham	Virginia	16
P. feriarum	CM	55968	Rockingham	Virginia	16
P. feriarum	CM	55975	Rockingham	Virginia	16
P. feriarum	CM	55984	Rockingham	Virginia	16
P. feriarum	CM	55985	Rockingham	Virginia	16
P. feriarum	CM	55987	Rockingham	Virginia	16
P. feriarum	CM	127401	Sussex	Virginia	18
P. feriarum	CM	127403	Sussex	Virginia	18
P. feriarum	CM	127407	Sussex	Virginia	18
P. feriarum	CM	127409	Sussex	Virginia	18
P. feriarum	CM	127411	Sussex	Virginia	18
P. feriarum	CM	127414	Sussex	Virginia	18
P. feriarum	CM	127415	Sussex	Virginia	18
P. feriarum	CM	127420	Sussex	Virginia	18
P. feriarum	CM	128205	Sussex	Virginia	18
P. feriarum	CM	128207	Sussex	Virginia	18
P. feriarum	CM	128209	Sussex	Virginia	18
P. feriarum	CM	18735	Hardy	West Virginia	9
P. feriarum	CM	19999	Hardy	West Virginia	9
P. feriarum	CM	20979	Hardy	West Virginia	9
P. feriarum	CM	24100	Hardy	West Virginia	9
P. feriarum	CM	26653	Hardy	West Virginia	9
P. feriarum	CM	26654	Hardy	West Virginia	9
P. feriarum	CM	36503	Hardy	West Virginia	9
P. feriarum	CM	36505	Hardy	West Virginia	9
P. feriarum	CM	36506	Hardy	West Virginia	9
P. feriarum	CM	36507	Hardy	West Virginia	9
P. fouquettei	TNHC	62255	Craighead	Arkansas	21
P. fouquettei	TNHC	62256	Craighead	Arkansas	21
P. fouquettei	TNHC	62257	Craighead	Arkansas	21
P. fouquettei	TNHC	62258	Craighead	Arkansas	21
P. fouquettei	TNHC	62259	Craighead	Arkansas	21

P. fouquettei	TNHC	62260	Craighead	Arkansas	21
P. fouquettei	TNHC	62261	Craighead	Arkansas	21
P. fouquettei	TNHC	62262	Craighead	Arkansas	21
P. fouquettei	TNHC	62263	Craighead	Arkansas	21
P. fouquettei	TNHC	62264	Craighead	Arkansas	21
P. fouquettei	MVZ	12487	Lawrence	Arkansas	21
P. fouquettei	MVZ	12488	Lawrence	Arkansas	21
P. fouquettei	ASUM	9960	Garland	Arkansas	30
P. fouquettei	ASUM	9961	Garland	Arkansas	30
P. fouquettei	ASUM	9962	Garland	Arkansas	30
P. fouquettei	ASUM	21063	Garland	Arkansas	30
P. fouquettei	ASUM	18234	Grant	Arkansas	30
P. fouquettei	ASUM	18236	Grant	Arkansas	30
P. fouquettei	ASUM	20535	Saline	Arkansas	30
P. fouquettei	ASUM	20588	Saline	Arkansas	30
P. fouquettei	ASUM	20589	Saline	Arkansas	30
P. fouquettei	ASUM	20830	Saline	Arkansas	30
P. fouquettei	ASUM	10380	Yell	Arkansas	30
P. fouquettei	ASUM	27610	Yell	Arkansas	30
P. fouquettei	ASUM	27611	Yell	Arkansas	30
P. fouquettei	LSU	14361	Caddo	Louisiana	19
P. fouquettei	LSU	14368	Caddo	Louisiana	19
P. fouquettei	LSU	14370	Caddo	Louisiana	19
P. fouquettei	LSU	14374	Caddo	Louisiana	19
P. fouquettei	LSU	14375	Caddo	Louisiana	19
P. fouquettei	LSU	14377	Caddo	Louisiana	19
P. fouquettei	LSU	14383	Caddo	Louisiana	19
P. fouquettei	LSU	14387	Caddo	Louisiana	19
P. fouquettei	LSU	14389	Caddo	Louisiana	19
P. fouquettei	LSU	19036	Caddo	Louisiana	19
P. fouquettei	LSU	20145	Caddo	Louisiana	19
P. fouquettei	LSU	67803	Caddo	Louisiana	19
P. fouquettei	TNHC	62265	East Baton Rouge	Louisiana	22
P. fouquettei	TNHC	62266	East Baton Rouge	Louisiana	22
P. fouquettei	TNHC	62267	East Baton Rouge	Louisiana	22
P. fouquettei	TNHC	63471	East Baton Rouge	Louisiana	22
P. fouquettei	TNHC	63472	East Baton Rouge	Louisiana	22
P. fouquettei	TNHC	63473	East Baton Rouge	Louisiana	22
P. fouquettei	TNHC	63474	East Baton Rouge	Louisiana	22
P. fouquettei	TNHC	63475	East Baton Rouge	Louisiana	22
P. fouquettei	TNHC	63476	East Baton Rouge	Louisiana	22
P. fouquettei	TNHC	63477	East Baton Rouge	Louisiana	22
P. fouquettei	TNHC	63478	East Baton Rouge	Louisiana	22
P. fouquettei	TNHC	63479	East Baton Rouge	Louisiana	22

P. fouquettei	FMNH	245351	Jefferson	Louisiana	24
P. fouquettei	FMNH	245352	Jefferson	Louisiana	24
P. fouquettei	FMNH	245353	Jefferson	Louisiana	24
P. fouquettei	FMNH	245354	Jefferson	Louisiana	24
P. fouquettei	FMNH	245355	Jefferson	Louisiana	24
P. fouquettei	FMNH	245356	Jefferson	Louisiana	24
P. fouquettei	FMNH	245359	Jefferson	Louisiana	24
P. fouquettei	FMNH	245362	Jefferson	Louisiana	24
P. fouquettei	LSU	67679	Lafayette	Louisiana	25
P. fouquettei	LSU	67698	Lafayette	Louisiana	25
P. fouquettei	LSU	67699	Lafayette	Louisiana	25
P. fouquettei	LSU	67700	Lafayette	Louisiana	25
P. fouquettei	LSU	67701	Lafayette	Louisiana	25
P. fouquettei	LSU	67702	Lafayette	Louisiana	25
P. fouquettei	LSU	67710	Lafayette	Louisiana	25
P. fouquettei	LSU	67717	Lafayette	Louisiana	25
P. fouquettei	LSU	67721	Lafayette	Louisiana	25
P. fouquettei	LSU	67726	Lafayette	Louisiana	25
P. fouquettei	LSU	67829	Lafayette	Louisiana	25
P. fouquettei	LSU	67830	Lafayette	Louisiana	25
P. fouquettei	AMNH	A46004	Hinds	Mississippi	23
P. fouquettei	AMNH	A46007	Hinds	Mississippi	23
P. fouquettei	AMNH	A46008	Hinds	Mississippi	23
P. fouquettei	AMNH	A46009	Hinds	Mississippi	23
P. fouquettei	AMNH	A46010	Hinds	Mississippi	23
P. fouquettei	AMNH	A46012	Hinds	Mississippi	23
P. fouquettei	OMNH	30504	Cleveland	Oklahoma	20
P. fouquettei	OMNH	30507	Cleveland	Oklahoma	20
P. fouquettei	OMNH	31032	Cleveland	Oklahoma	20
P. fouquettei	OMNH	31033	Cleveland	Oklahoma	20
P. fouquettei	OMNH	38137	Cleveland	Oklahoma	20
P. fouquettei	OMNH	17599	McCurtain	Oklahoma	26
P. fouquettei	OMNH	23590	McCurtain	Oklahoma	26
P. fouquettei	OMNH	23669	McCurtain	Oklahoma	26
P. fouquettei	OMNH	23670	McCurtain	Oklahoma	26
P. fouquettei	OMNH	23671	McCurtain	Oklahoma	26
P. fouquettei	OMNH	23672	McCurtain	Oklahoma	26
P. fouquettei	OMNH	23673	McCurtain	Oklahoma	26
P. fouquettei	OMNH	23674	McCurtain	Oklahoma	26
P. fouquettei	OMNH	30892	McCurtain	Oklahoma	26
P. fouquettei	OMNH	38138	McCurtain	Oklahoma	26
P. fouquettei	OMNH	39599	Muskogee	Oklahoma	27
P. fouquettei	OMNH	39600	Muskogee	Oklahoma	27
P. fouquettei	OMNH	39617	Muskogee	Oklahoma	27

P. fouquettei	TNHC	20691	Newton	Texas	28
P. fouquettei	TNHC	20692	Newton	Texas	28
P. fouquettei	TNHC	20693	Newton	Texas	28
P. fouquettei	TNHC	20694	Newton	Texas	28
P. fouquettei	TNHC	20695	Newton	Texas	28
P. fouquettei	TNHC	20696	Newton	Texas	28
P. fouquettei	TNHC	20698	Newton	Texas	28
P. fouquettei	TNHC	20699	Newton	Texas	28
P. fouquettei	TNHC	20700	Newton	Texas	28
P. fouquettei	TNHC	20701	Newton	Texas	28
P. fouquettei	TNHC	20702	Newton	Texas	28
P. fouquettei	TNHC	20704	Newton	Texas	28
P. fouquettei	UTA	41496	Walker	Texas	29
P. fouquettei	UTA	41497	Walker	Texas	29
P. fouquettei	UTA	41498	Walker	Texas	29
P. fouquettei	UTA	41499	Walker	Texas	29
P. fouquettei	UTA	41500	Walker	Texas	29
P. fouquettei	UTA	41501	Walker	Texas	29
P. fouquettei	UTA	41502	Walker	Texas	29
P. fouquettei	UTA	41503	Walker	Texas	29
P. fouquettei	UTA	41504	Walker	Texas	29
P. fouquettei	UTA	41505	Walker	Texas	29
P. fouquettei	UTA	41506	Walker	Texas	29
P. fouquettei	UTA	41507	Walker	Texas	29
P. maculata	FMNH	35232	Henry	Iowa	40
P. maculata	FMNH	35233	Henry	Iowa	40
P. maculata	FMNH	35234	Henry	Iowa	40
P. maculata	FMNH	35235	Henry	Iowa	40
P. maculata	FMNH	35236	Henry	Iowa	40
P. maculata	FMNH	35237	Henry	Iowa	40
P. maculata	FMNH	35240	Henry	Iowa	40
P. maculata	FMNH	35241	Henry	Iowa	40
P. maculata	FMNH	35242	Henry	Iowa	40
P. maculata	FMNH	35243	Henry	Iowa	40
P. maculata	FMNH	35244	Henry	Iowa	40
P. maculata	FMNH	35245	Henry	Iowa	40
P. maculata	TNHC	63365	Marion	Iowa	41
P. maculata	TNHC	63366	Marion	Iowa	41
P. maculata	TNHC	63367	Marion	Iowa	41
P. maculata	TNHC	63369	Marion	Iowa	41
P. maculata	TNHC	63370	Warren	Iowa	41
P. maculata	TNHC	63371	Warren	Iowa	41
P. maculata	KU	224560	Douglas	Kansas	42
P. maculata	KU	224561	Douglas	Kansas	42

P. maculata	KU	224562	Douglas	Kansas	42
P. maculata	KU	224569	Douglas	Kansas	42
P. maculata	KU	224571	Douglas	Kansas	42
P. maculata	KU	224572	Douglas	Kansas	42
P. maculata	KU	224573	Douglas	Kansas	42
P. maculata	KU	224574	Douglas	Kansas	42
P. maculata	KU	224575	Douglas	Kansas	42
P. maculata	KU	224576	Douglas	Kansas	42
P. maculata	KU	224578	Douglas	Kansas	42
P. maculata	KU	224579	Douglas	Kansas	42
P. maculata	AMNH	A119914	McHenry	North Dakota	43
P. maculata	AMNH	A119915	McHenry	North Dakota	43
P. maculata	AMNH	A119916	McHenry	North Dakota	43
P. maculata	AMNH	A119917	McHenry	North Dakota	43
P. maculata	AMNH	A119918	McHenry	North Dakota	43
P. maculata	AMNH	A119919	McHenry	North Dakota	43
P. maculata	AMNH	A119920	McHenry	North Dakota	43
P. maculata	AMNH	A119921	McHenry	North Dakota	43
P. maculata	AMNH	A119922	McHenry	North Dakota	43
P. maculata	AMNH	A119923	McHenry	North Dakota	43
P. maculata	AMNH	A119924	McHenry	North Dakota	43
P. maculata	AMNH	A119925	McHenry	North Dakota	43
P. maculata	MVZ	29913	Uintah	Utah	44
P. maculata	MVZ	29914	Uintah	Utah	44
P. maculata	MVZ	29915	Uintah	Utah	44
P. maculata	MVZ	29917	Uintah	Utah	44
P. maculata	MVZ	29918	Uintah	Utah	44
P. maculata	MVZ	29919	Uintah	Utah	44
P. maculata	MVZ	29920	Uintah	Utah	44
P. maculata	FMNH	5524	Clark	Wisconsin	45
P. maculata	FMNH	5525	Clark	Wisconsin	45
P. maculata	FMNH	14621	Clark	Wisconsin	45
P. maculata	FMNH	14622	Clark	Wisconsin	45
P. maculata	FMNH	14625	Clark	Wisconsin	45
P. maculata	FMNH	14626	Clark	Wisconsin	45
P. maculata	FMNH	14627	Clark	Wisconsin	45
P. maculata	FMNH	14628	Clark	Wisconsin	45
P. maculata	FMNH	14629	Clark	Wisconsin	45
P. maculata	FMNH	14630	Clark	Wisconsin	45
P. maculata	FMNH	14631	Clark	Wisconsin	45
P. maculata	AMNH	A101272	Portage	Wisconsin	46
P. maculata	AMNH	A101273	Portage	Wisconsin	46
P. maculata	AMNH	A101274	Portage	Wisconsin	46
P. maculata	AMNH	A101275	Portage	Wisconsin	46

P. maculata	AMNH	A101276	Portage	Wisconsin	46
P. maculata	AMNH	A79926	Portage	Wisconsin	46
P. maculata	AMNH	A79927	Portage	Wisconsin	46
P. maculata	AMNH	A79928	Portage	Wisconsin	46
P. maculata	AMNH	A79929	Portage	Wisconsin	46
P. maculata	AMNH	A79930	Portage	Wisconsin	46
P. maculata	USNM	197422	Price	Wisconsin	47
P. maculata	USNM	336471	Price	Wisconsin	47
P. maculata	USNM	336472	Price	Wisconsin	47
P. maculata	USNM	336473	Price	Wisconsin	47
P. nigrita	AUM	4461	Barbour	Alabama	32
P. nigrita	AUM	4462	Barbour	Alabama	32
P. nigrita	AUM	4463	Barbour	Alabama	32
P. nigrita	AUM	4464	Barbour	Alabama	32
P. nigrita	AUM	4465	Barbour	Alabama	32
P. nigrita	AUM	4466	Barbour	Alabama	32
P. nigrita	AUM	4467	Barbour	Alabama	32
P. nigrita	AUM	4468	Barbour	Alabama	32
P. nigrita	AUM	4469	Barbour	Alabama	32
P. nigrita	AUM	4470	Barbour	Alabama	32
P. nigrita	AUM	4471	Barbour	Alabama	32
P. nigrita	AUM	4472	Barbour	Alabama	32
P. nigrita	AUM	7737	Escambia	Alabama	37
P. nigrita	AUM	7738	Escambia	Alabama	37
P. nigrita	AUM	7740	Escambia	Alabama	37
P. nigrita	AUM	7741	Escambia	Alabama	37
P. nigrita	AUM	7743	Escambia	Alabama	37
P. nigrita	AUM	7744	Escambia	Alabama	37
P. nigrita	AUM	7745	Escambia	Alabama	37
P. nigrita	AUM	7747	Escambia	Alabama	37
P. nigrita	AUM	32343	Escambia	Alabama	37
P. nigrita	GMNH	10478	Alachua	Florida	31
P. nigrita	GMNH	10479	Alachua	Florida	31
P. nigrita	GMNH	10480	Alachua	Florida	31
P. nigrita	GMNH	10481	Alachua	Florida	31
P. nigrita	GMNH	10482	Alachua	Florida	31
P. nigrita	GMNH	10483	Alachua	Florida	31
P. nigrita	GMNH	10484	Alachua	Florida	31
P. nigrita	GMNH	10485	Alachua	Florida	31
P. nigrita	GMNH	10486	Alachua	Florida	31
P. nigrita	GMNH	10487	Alachua	Florida	31
P. nigrita	GMNH	10488	Alachua	Florida	31
P. nigrita	GMNH	10489	Alachua	Florida	31
P. nigrita	USNM	489870	Santa Rosa	Florida	38

P. nigrita	USNM	489872	Santa Rosa	Florida	38
P. nigrita	USNM	489873	Santa Rosa	Florida	38
P. nigrita	USNM	489876	Santa Rosa	Florida	38
P. nigrita	USNM	489878	Santa Rosa	Florida	38
P. nigrita	USNM	489880	Santa Rosa	Florida	38
P. nigrita	USNM	489883	Santa Rosa	Florida	38
P. nigrita	USNM	489885	Santa Rosa	Florida	38
P. nigrita	USNM	99054	Beaufort	North Carolina	34
P. nigrita	USNM	99055	Beaufort	North Carolina	34
P. nigrita	USNM	99056	Beaufort	North Carolina	34
P. nigrita	USNM	99057	Beaufort	North Carolina	34
P. nigrita	MVZ	145452	Scotland	North Carolina	39
P. nigrita	MVZ	145453	Scotland	North Carolina	39
P. nigrita	MVZ	145454	Scotland	North Carolina	39
P. nigrita	MVZ	150303	Scotland	North Carolina	39
P. nigrita	GMNH	44591	Barnwell	South Carolina	33
P. nigrita	GMNH	44603	Barnwell	South Carolina	33
P. nigrita	GMNH	44609	Barnwell	South Carolina	33
P. nigrita	GMNH	44610	Barnwell	South Carolina	33
P. nigrita	TNHC	62202	Barnwell	South Carolina	33
P. nigrita	TNHC	62203	Barnwell	South Carolina	33
P. nigrita	TNHC	62204	Barnwell	South Carolina	33
P. nigrita	TNHC	62205	Barnwell	South Carolina	33
P. nigrita	TNHC	62206	Barnwell	South Carolina	33
P. nigrita	TNHC	62207	Barnwell	South Carolina	33
P. nigrita	TNHC	62208	Barnwell	South Carolina	33
P. nigrita	TNHC	62209	Barnwell	South Carolina	33
P. nigrita	CM	20053	Berkeley	South Carolina	35
P. nigrita	CM	20055	Berkeley	South Carolina	35
P. nigrita	CM	20065	Berkeley	South Carolina	35
P. nigrita	CM	20066	Berkeley	South Carolina	35
P. nigrita	CM	55960	Berkeley	South Carolina	35
P. nigrita	CM	20055e	Berkeley	South Carolina	35
P. nigrita	CM	20055f	Berkeley	South Carolina	35
P. nigrita	CM	20055g	Berkeley	South Carolina	35
P. nigrita	CM	20055h	Berkeley	South Carolina	35
P. nigrita	CM	20055i	Berkeley	South Carolina	35
P. nigrita	TNHC	3228	Dorchester	South Carolina	36
P. nigrita	TNHC	3229	Dorchester	South Carolina	36
P. nigrita	TNHC	3230	Dorchester	South Carolina	36
P. nigrita	TNHC	3231	Dorchester	South Carolina	36
P. nigrita	TNHC	3232	Dorchester	South Carolina	36
P. nigrita	TNHC	3233	Dorchester	South Carolina	36
P. nigrita	TNHC	63538	Dorchester	South Carolina	36

Appendix 2. List of *Pseudacis* analyzed for advertisement call

Specimens are deposited in the Texas Natural History Collection, University of Texas, Austin (TNHC) unless listed as not captured (not cap.). Locality numbers refer to specific collection sites described in the footnote below. Geographic coordinates were taken at the time of collection.

Species	Field No.	TNHC No.	County	State	Locality	Latitude	Longitude
P. feriarum	ECM0129	62271	Weakley	Tennessee	1	36.2579	-88.6676
P. feriarum	ECM0130	62272	Weakley	Tennessee	1	36.2579	-88.6676
P. feriarum	ECM0131	62273	Obion	Tennessee	2	36.2579	-89.2597
P. feriarum	ECM0132	62274	Obion	Tennessee	2	36.2579	-89.2597
P. feriarum	ECM0135	62276	Obion	Tennessee	3	36.4529	-89.3035
P. feriarum	ECM0136	62383	Obion	Tennessee	3	36.4529	-89.3035
P. feriarum	ECM0387	63123	Macon	Alabama	4	32.5290	-85.6016
P. feriarum	ECM0388	63124	Macon	Alabama	4	32.5290	-85.6016
P. feriarum	ECM0389	63125	Macon	Alabama	4	32.5290	-85.6016
P. feriarum	ECM0390	63126	Macon	Alabama	4	32.5290	-85.6016
P. feriarum	ECM0391	63127	Macon	Alabama	4	32.5290	-85.6016
P. feriarum	ECM0392	63128	Macon	Alabama	4	32.5290	-85.6016
P. feriarum	ECM0393	63129	Macon	Alabama	4	32.5290	-85.6016
P. feriarum	ECM0394	not cap.	Macon	Alabama	4	32.5290	-85.6016
P. feriarum	ECM0395	63130	Macon	Alabama	4	32.5290	-85.6016
P. feriarum	ECM0396	not cap.	Macon	Alabama	4	32.5290	-85.6016
P. feriarum	ECM0397	63131	Macon	Alabama	4	32.5290	-85.6016
P. feriarum	ECM0398	63132	Macon	Alabama	4	32.5290	-85.6016
P. feriarum	ECM0400	63133	Macon	Alabama	5	32.5290	-85.6016
P. fouquettei	ECM0011	62255	Craighead	Arkansas	6	35.8546	-90.6626
P. fouquettei	ECM0012	62256	Craighead	Arkansas	6	35.8546	-90.6626
P. fouquettei	ECM0013	62257	Craighead	Arkansas	6	35.8546	-90.6626
P. fouquettei	ECM0014	62258	Craighead	Arkansas	6	35.8546	-90.6626
P. fouquettei	ECM0015	62259	Craighead	Arkansas	6	35.8546	-90.6626
P. fouquettei	ECM0016	62260	Craighead	Arkansas	6	35.8546	-90.6626
P. fouquettei	ECM0017	62261	Craighead	Arkansas	6	35.8546	-90.6626
P. fouquettei	ECM0018	62262	Craighead	Arkansas	6	35.8546	-90.6626
P. fouquettei	ECM0019	62263	Craighead	Arkansas	6	35.8546	-90.6626
P. fouquettei	ECM0020	62264	Craighead	Arkansas	6	35.8546	-90.6626
P. fouquettei	ECM0029	62265	East Baton Rouge	Louisiana	7	30.7147	-90.8919
P. fouquettei	ECM0030	62266	East Baton Rouge	Louisiana	7	30.7147	-90.8919
P. fouquettei	ECM0031	62267	East Baton Rouge	Louisiana	7	30.7147	-90.8919
P. fouquettei	ECM0124	62269	Washington	Louisiana	8	30.6787	-89.9480
P. fouquettei	ECM0125	62379	Washington	Louisiana	8	30.6787	-89.9480
P. fouquettei	ECM0137	62277	Evangeline	Louisiana	9	30.7801	-92.2819
P. fouquettei	ECM0138	62278	Evangeline	Louisiana	9	30.7801	-92.2819
P. fouquettei	ECM0304	63471	East Baton Rouge	Louisiana	10	30.7147	-90.8919
P. fouquettei	ECM0305	63472	East Baton Rouge	Louisiana	10	30.7147	-90.8919
P. fouquettei	ECM0306	63473	East Baton Rouge	Louisiana	10	30.7147	-90.8919
P. fouquettei	ECM0307	63474	East Baton Rouge	Louisiana	10	30.7147	-90.8919

P. fouquettei	ECM0308	63475	East Baton Rouge	Louisiana	10	30.7147	-90.8919
P. fouquettei	ECM0309	63476	East Baton Rouge	Louisiana	10	30.7147	-90.8919
P. fouquettei	ECM0310	63477	East Baton Rouge	Louisiana	10	30.7147	-90.8919
P. fouquettei	ECM0311	63478	East Baton Rouge	Louisiana	10	30.7147	-90.8919
P. fouquettei	ECM0313	not cap.	East Baton Rouge	Louisiana	10	30.7147	-90.8919
P. maculata	ECM0099	62377	Douglas	Kansas	11	39.9557	-95.3285
P. maculata	ECM0099a	not cap.	Douglas	Kansas	11	39.9557	-95.3285
P. maculata	ECM0100	not cap.	Douglas	Kansas	11	39.9557	-95.3285
P. maculata	ECM0101	62378	Douglas	Kansas	11	39.9557	-95.3285
P. maculata	ECM2448	65031	Douglas	Kansas	12	39.0369	-95.2142
P. maculata	ECM2450	65033	Douglas	Kansas	12	39.0369	-95.2142
P. maculata	ECM2452	65035	Douglas	Kansas	12	39.0369	-95.2142
P. maculata	ECM2454	65036	Douglas	Kansas	12	39.0369	-95.2142
P. maculata	ECM2456	65038	Douglas	Kansas	12	39.0369	-95.2142
P. maculata	ECM2457	65039	Douglas	Kansas	12	39.0369	-95.2142
P. maculata	ECM2458	65040	Douglas	Kansas	12	39.0369	-95.2142
P. maculata	ECM2459	65041	Douglas	Kansas	12	39.0369	-95.2142
P. maculata	ECM2460	65042	Douglas	Kansas	12	39.0369	-95.2142
P. maculata	ECM2462	not cap.	Douglas	Kansas	12	39.0369	-95.2142
P. maculata	ECM2463	not cap.	Douglas	Kansas	12	39.0369	-95.2142
P. nigrita	ECM0024	62364	Brevard	Florida	13	28.2000	-80.8041
P. nigrita	ECM0025	62365	Brevard	Florida	13	28.2000	-80.8041
P. nigrita	ECM0026	62366	Brevard	Florida	13	28.2000	-80.8041
P. nigrita	ECM0027	62367	Brevard	Florida	13	28.2000	-80.8041
P. nigrita	ECM0028	62368	Brevard	Florida	13	28.2000	-80.8041
P. nigrita	ECM0062a	not cap.	Barnwell	South Carolina	14	33.3177	-81.4769
P. nigrita	ECM0065	62203	Barnwell	South Carolina	14	33.3177	-81.4769
P. nigrita	ECM0066a	not cap.	Barnwell	South Carolina	14	33.3177	-81.4769
P. nigrita	ECM0067	62204	Barnwell	South Carolina	14	33.3177	-81.4769
P. nigrita	ECM0069	62206	Barnwell	South Carolina	14	33.3177	-81.4769
P. nigrita	ECM0372	63201	Jefferson	Florida	15	30.1981	-84.0500
P. nigrita	ECM0373	63202	Jefferson	Florida	15	30.1981	-84.0500
P. nigrita	ECM0374	63203	Jefferson	Florida	15	30.1981	-84.0500
P. nigrita	ECM0375	63204	Jefferson	Florida	15	30.1981	-84.0500
P. nigrita	ECM0376	63205	Jefferson	Florida	15	30.1981	-84.0500
P. nigrita	ECM0377	63206	Jefferson	Florida	15	30.1981	-84.0500
P. nigrita	ECM0378	63207	Jefferson	Florida	15	30.1981	-84.0500
P. nigrita	ECM0379	63208	Jefferson	Florida	15	30.1981	-84.0500
P. nigrita	ECM0381	not cap.	Jefferson	Florida	15	30.1981	-84.0500

Localities: (1) ditches 0.4 mi from Old SR22 on Summers Dr., W of Gleason; (2) 0.5 mi S from 183 on Sharps Ferry Rd; (3) just off Hwy 157 at Reelfoot Lake Wildlife Refuge Information Center; (4) 0.2mi SW jct CR137 (Wire Rd) and CR54 on CR54; (5) 0.1 mi S I-85 on SR81 to Tuskegee; (6) Jonesboro, at jct Stadium (Hwy 49) and Johnson St; (7) W of Baywood on Lee Price Rd, 1.4 mi. from LA37; (8) Hwy 1074, 3.7 mi W Rio; (9) E side CR3042 near Chico State Park 4.9 mi S of Hwy 106; (10) W of Baywood on Lee Price Rd, 0.6 to 0.3 mi from LA37; (11) Lawrence, 0.15 mi S of jct 15th St. and Legend Trail; (12) N of Lawrence Municipal Airport, 0.56 mi N of jct between N 2000 Rd. and E 1550 Rd. on E 1550 Rd.; (13) Duda Ranch between Rock Ledge and Melbourne on SR519 (Fiske Rd); (14) Savannah River Site, Mona Bay; (15) 0.5 mi N of jct Hwy 98 and SR59 on SR59.