

Catalogue of American Amphibians and Reptiles.

Glorioso, B.M. 2010. *Pseudacris ornata*.

***Pseudacris ornata* (Holbrook)
Ornate Chorus Frog**

Rana ornata Holbrook 1836:97. Type-locality, "...only in South Carolina...about four miles from Charleston, between the Cooper and Ashley rivers...[Charleston County, South Carolina]". Holotype not designated; figured in Holbrook (1836, plate 16).

Cystignathus ornatus: Holbrook 1842:103.

C(horophilus) ornatus: Le Conte 1855:428.

Chorophilus ocellaris: Cope 1875:30.

Chorophilus copii: Boulenger 1882:334.

Chorophilus occidentalis: Cope 1889:335

Hyla copii: Gunther 1901:266.

Pseudacris occidentalis: Stejneger and Barbour 1917:30.

Pseudacris ornata: Stejneger and Barbour 1917:31.

P(seudacris) copii: Noble 1923:1.

Hyla occidentalis: Noble 1923:5. By implication.

Hyla ornata: Noble 1923:5. By implication.

Hyla weberi: Noble 1923:5. Replacement name for *Chorophilus copii* Boulenger 1882.

Hyla (Pseudacris) ornata: Dubois 1984:85.

• **CONTENT.** No subspecies are recognized.

• **DEFINITION.** The following has been adapted from Brown (1956). This small, but stout, hylid frog has a known maximum length of ca. 40 mm. The head is relatively small with a pointed snout, bearing a dark triangular mark between the eyes, with a posteriorly directed apex. This marking may be faint or entirely absent in some individuals. The nostrils lie nearly equidistant from the eye to the tip of the snout and are placed on a slight prominence. The tympanum is small and darkly colored. Extending from the tip of the snout, through the nostril, and to the eye is a thin, dark stripe. This stripe broadens posterior to the eye, enclosing the tympanum, and extends backward to the arm. Beyond the arm, on the sides of the body, is a single broad stripe extending about half-way to the groin. This stripe will sometimes be replaced by a series of 1 to 3 spots, the first of which is usually elongate. Dorsally, 2 longitudinal stripes may extend from just past the tympanum to the groin on both sides of the midline. In many instances these stripes may be broken or completely absent. The anterior surface of the upper arm contains a dark line, which extends onto the body for a short distance. Two thin bars are usually present on the forearm. The upper surface of the hind leg is light brown with typically 2 dark bars on the thigh and 3 on the lower leg. The lower half of the rear of the thigh is reticulate, with dark lines enclosing small yellow spots. The edge of the upper lip is black or dark brown, above which is a yellowish-white line from the tip of the snout to the arm, being broadest just under or anterior to the eye. The edge of the lower lip has large

white spots with thin black bars between them. The ground coloration of this frog is extremely variable, but is predominantly gray, brown, reddish-brown, pinkish, or green. Some may even be nearly black. In juveniles, the details of pattern are not clearly demarcated. The venter is whitish, and the dorsal skin is smooth. The tips of digits are somewhat rounded, but not obviously expanded. Only a trace of webbing is present between the third and fourth toe.

Tadpoles exhibit lateral eyes and the body is reddish-brown with light dorsolateral lines extending from the snout along the length of the body (Gregoire 2005). The belly is light in color and the throat is clear. The tail exhibits a highly arched dorsal fin, which extends well onto the body, terminating dorsally near the eyes. Small tadpoles have darker markings on the dorsal tail muscle than the ventral, but this bi-coloration becomes more uniformly pigmented as they grow larger. The labial tooth row formula is 2(2)/3[1] (Altig 1971).

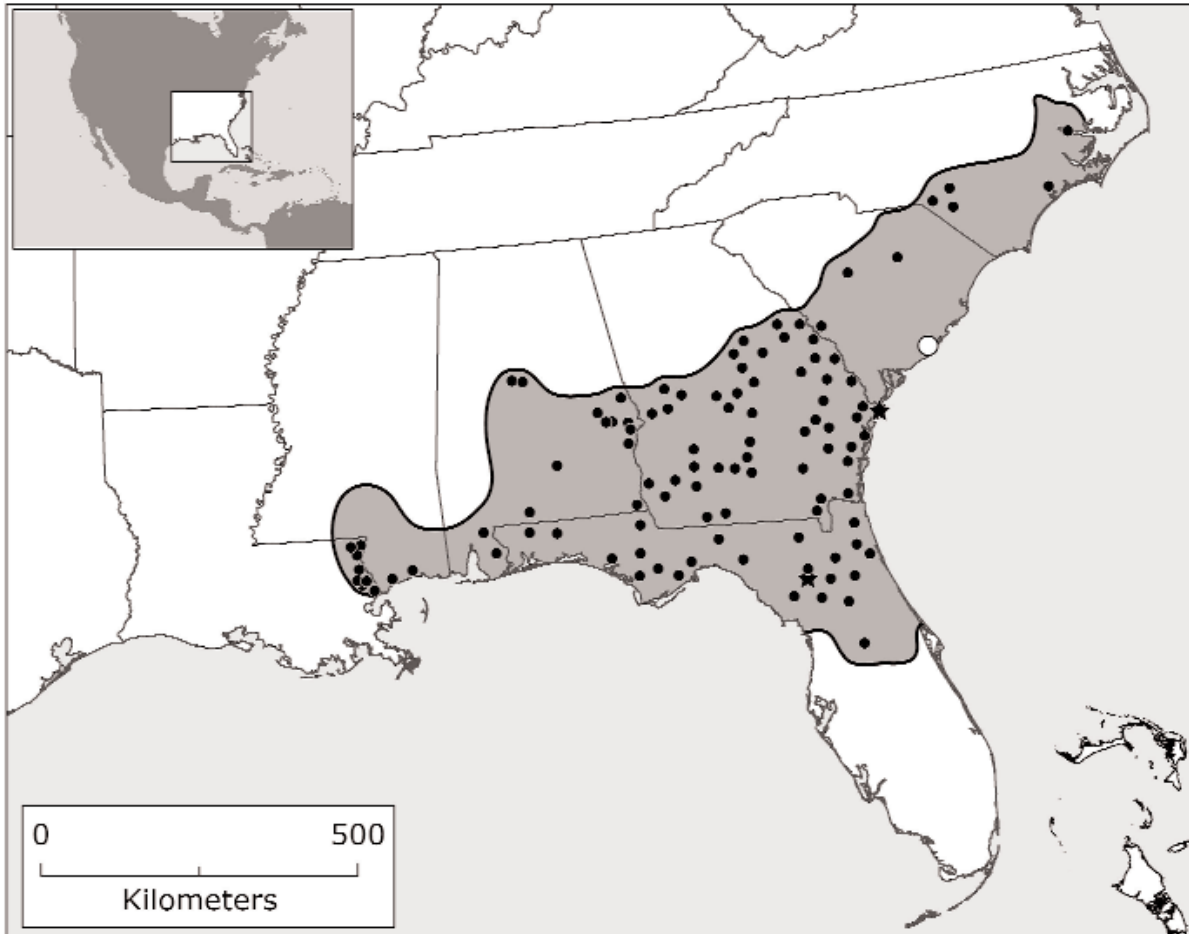


FIGURE 1. Two adult *Pseudacris ornata*, a reddish-brown phase (left) and a green phase (right), from Okaloosa County, Florida (photograph by John Jensen).



FIGURE 2. A *Pseudacris ornata* tadpole from Evans County, Georgia (photograph by Dirk Stevenson).

• **DESCRIPTIONS.** Detailed descriptions of general morphology, coloration, and/or natural history appear in Altig (1971), Brown (1956), Deckert (1915), Harper (1931), Jensen (2008), Siekmann (1949), Wright (1932), and Wright and Wright (1949). General descriptions appear in the following: Ashton and Ashton (1988), Barker (1964), Bartlett and Bartlett (1998), Behler and King (1979), Carr (1940b), Conant and Collins (1991), Dickerson (1907), Dundee and Rossman (1989), Fanning (1966), Gibbons and Semlitsch (1991), Holman (2003), Martof et al. (1980), Mount (1975), and Wever (1985). A description of the



MAP. Distribution of *Pseudacris ornata*. The circle indicates the type-locality, dots other records. The stars indicate fossil records.

ear appears in Wever (1985).

• **ILLUSTRATIONS.** Color photographs and illustrations of **adults** appear in Ashton and Ashton (1988), Bartlett (1994), Bartlett and Bartlett (1998), Behler and King (1979), Carmichael and Williams (2000), Cochran (1961), Conant and Collins (1991), Dundee and Rossman (1989), Gregoire (2005), Holman (2003), Jensen (2008), Leviton (1972), Martof et al. (1980), Moler (1983), Palis (1995), Reichling (2008), and Zim and Smith (1956). Gregoire (2005) and Jensen (2008) also provide color photographs of **tadpoles**. Black-and-white photographs or illustrations are as follows: **adults** (Barker 1964; Harper 1931, 1937; Mount 1975; Murphy 1979; Obst et al. 1988; Wright 1932; Wright and Wright 1949), **breeding adults** (Travis 2006), **electron micrograph of a tadpole labial tooth** (Altig and Pace 1974), **habitat** (Harper 1937), **hybrids** (Mecham 1957, 1965), and **karyotype** (Wiley 1982). A line drawing of an egg is provided by Livezey and Wright (1947). Altig (1971) provided two tadpole line drawings, one a lateral view and the other a ventral view of the oral disc. Gaudin (1969, 1974) provided a line drawing of dorsal and ventral views of the skull. Gaudin (1969) also provided line drawings of the pectoral girdle. Line drawings of the right ilium and ethmoid are found in Chantell

(1968). Holman (2003) provided line drawings of the right ilium, right scapula, and right humerus.

• **DISTRIBUTION.** This is an Atlantic Coastal Plain species, and can be found from eastern North Carolina south to central Florida, and west to extreme southeast Louisiana. Distribution maps are provided by Ashton and Ashton (1988), Bartlett and Bartlett (1998), Behler and King (1979), Conant and Collins (1991), Duellman (1999), Dundee and Rossman (1989), Gaudin (1969), Harper (1937), Jensen (2008), Martof et al. (1980), Mount (1975), Murphy (1979), Porter (1972), and Wright and Wright (1949).

• **FOSSIL RECORD.** Pleistocene (Rancholabrean) fossils of *P. ornata* have been found at the Arredondo Site, Alachua County, Florida (Holman 1995, 2003; Lynch 1965; Sanchiz 1998). The Isle of Hope Site in Chatham County, Georgia, has also produced *P. ornata* fossils (Holman 2003; Hulbert and Pratt 1998). Russell et al. (2009) placed this record in the context of a warm Late Pleistocene climate in the southeastern United States.

• **PERTINENT LITERATURE.** References are listed by primary topic: **activity** (Gibbons and Bennett 1974; Semitsch et al. 1996), **anatomy and**

morphology (Burger and Snodgrass 2000; Chantell 1968; Gaudin 1969, 1973, 1974; Goin 1958; Holman 1959; Hunsaker and Johnson 1959; Liu 1935; Middleman and List 1953; Paukstis and Brown 1987, 1991), **behavior** (Doherty and Gerhardt 1984; Hailman and Jaeger 1974; Jaeger and Hailman 1973; Pechmann and Semlitsch 1986), **capture methods** (Enge 2001; Gibbons and Semlitsch 1981), **checklists and similar compendia** (Banks et al. 1987; Cliburn 1970; Collins and Taggart 2002; Cope 1875; Crother 2000; Frank and Ramus 1995; Frost 1985; Luhring 2007; Schmidt 1953; Van Hyning 1933; Yarrow 1882), **color polymorphism** (Blouin 1989a,b; Hoffman and Blouin 2000; Travis and Trexler 1984), **conservation and management** (Cromer et al. 2002; Daszak et al. 2005; Foley 2000; Gibbons et al. 2006; Hanlin et al. 2000; Hayes and Steidl 1997; Jensen 2005; Means et al. 2004; Millsap et al. 1990; Owens et al. 2008; Palis and Aresco 2007; Pechmann et al. 1991; Reed and Blaustein 1995; Moseley et al. 2003; Semlitsch and Bodie 2003; Todd et al. 2009), **ecology and natural history** (Alford 1981, 1986; Allen 1932; Ashton and Ashton 1977; Brandt 1936, 1953; Brown and Means 1984; Caldwell 1987; Carr 1940a,b; Cloninger and Camper 2005; Corrington 1929; Dodd et al. 2007; Dorcas et al. 2006; Eason and Fauth 2001; Gibbons and Coker 1978; Harper 1937; Jobson 1940; Limer et al. 2008; Littlejohn 1958; Means and Campbell 1981; Neill 1952; Pechmann and Semlitsch 1986; Pechmann et al. 1989, 1991, 2001; Richmond 1968; Schurbon 2000; Schurbon and Fauth 2003, 2004; Schwartz 1957; Semlitsch et al. 1996; Snodgrass et al. 2000; Smith et al. 2006; Todd and Winne 2006; Trauth 1982; Tuberville et al. 2005; Viosca 1938), **evolution and phylogeny** (Brandt and Walker 1933; Cocroft 1994; Cocroft and Ryan 1995; da Silva 1997; Faivovich et al. 2005; Hedges 1986; Highton 1991; Jameson and Richmond 1971; Lemmon 2007; Lemmon et al. 2007a,b; Maxson and Wilson 1975; Means and Simberloff 1987; Moriarty and Cannatella 2004; Olalla-Tárraga and Rodríguez 2007; Paukstis and Brown 1987, 1991; Smith et al. 2005; Wiens et al. 2005; Yeh 2002), **genetics** (Bachmann et al. 1966; Bachmann and Cowden 1967; Degner et al. 2009; Goin et al. 1968; Green and Sessions 1991; Schmid 1978; Wiley 1982), **key - adults** (Brown 1956; Burt 1938; Carr 1940b; Chermock 1952; Dickerson 1907; Dundee and Rossman 1989; Gibbons and Semlitsch 1991; Lohofener and Altig 1983; Mount 1975; Powell et al. 1998), **key - eggs** (Brown 1956; Livezey and Wright 1947), **key - tadpoles** (Altig 1970; Brown 1956; Chermock 1952; Dundee and Rossman 1989; Fanning 1966; Gibbons and Semlitsch 1991; Lohofener and Altig 1983; Mount 1975; Orton 1952; Travis 1981), **parasitism** (Robinson 1954; Walton 1946), **physiology** (Harkey and Semlitsch 1988; Warner and Dunson 1998), **predation** (Depkin et al. 1992), **reproduction** (Blair 1958a,b, 1962; Blair and Littlejohn 1960; Gerhardt 1973; Martof 1961; Mecham 1957, 1959, 1965; Neill 1957; Sasa et al. 1998; Sekerak et al. 1996), **tadpole descriptions** (Altig 1971; Altig and Pace 1974; Carr

and Altig 1992), **vocalization** (Blair 1958a,b,c; Blair and Littlejohn 1960; Brown and Means 1984; Cocroft and Ryan 1995; Gerhardt 1973; Martof 1961; Moler 1983; Palis 1995; Pinkowski 1993; Thompson and Martof 1957).

• **ETYMOLOGY.** The specific epithet *ornata* is derived from Latin and means “decorated” or “ornate”, in reference to the dorsal markings seen on this frog.

• **ACKNOWLEDGMENTS.** I thank Brian Miller for helpful suggestions and criticisms, and John Jensen and Dirk Stevenson for use of their photographs.

LITERATURE CITED

- Alford, R.A. 1981. Community Organization and Behavior of Anuran Larvae in a Northern Florida Temporary Pond. M.S. Thesis, Univ. Florida, Gainesville.
- . 1986. Habitat use and positional behavior of anuran larvae in a northern Florida temporary pond. *Copeia* 1986:408–423.
- Allen, M.J. 1932. A survey of the amphibians and reptiles of Harrison County, Mississippi. *Amer. Mus. Novitates* (542):1–20.
- Altig, R. 1970. A key to the tadpoles of the continental United States and Canada. *Herpetologica* 26: 180–207.
- . 1971. Descriptive notes on the tadpoles of *Pseudacris ornata* and *Bufo alvarius*. *Texas J. Sci.* 23: 301–303.
- and W.L. Pace. 1974. Scanning electron photomicrographs of tadpole labial teeth. *J. Herpetol.* 8: 247–251.
- Ashton, R.E., Jr., and P.S. Ashton. 1977. Investigation into the natural history of *Pseudacris ornata* in north central Florida: preliminary report. *Herpetol. Rev.* 8(3, Suppl.):1 (Abstr.).
- and –. 1988. *Handbook of Reptiles and Amphibians of Florida: The Amphibians, Part 3.* Windward Publishing, Inc., Miami, Florida.
- Bachmann, K., O.B. Goin, and C.J. Goin. 1966. Hylid frogs: polyploid classes of DNA in liver nuclei. *Science* 154:650–651.
- and R.R. Cowden. 1967. A quantitative cytochemical study of the “polyploid” liver nuclei of the frog genus *Pseudacris*. *Trans. Amer. Microsc. Soc.* 86: 454–463.
- Banks, R.C., R.W. McDiarmid, and A.L. Gardner (eds.). 1987. Checklist of vertebrates of the United States, the U.S. Territories, and Canada. USDI, Fish Wildl. Serv., Res. Publ. (166):ii + 79 p.
- Barker, W. 1964. *Familiar Reptiles and Amphibians of America.* Harper Row Publ., New York.
- Bartlett, R.D. 1994. Herping the Southeast: a January jaunt. *Trop. Fish Hobbyist* 42:144–150, 152, 154, 156–158.
- and P.B. Bartlett. 1998. *A Field Guide to Florida Reptiles and Amphibians.* Gulf Publ. Co., Houston, Texas.
- Behler, J.L. and F.W. King. 1979. *The Audubon Society Field Guide to North American Reptiles and*

- Amphibians. A.A. Knopf, New York.
- Blair, W.F. 1958a. Call differences as an isolation mechanism in Florida species of hylid frogs. *Quart. J. Florida Acad. Sci.* 21:32–48.
- . 1958b. Mating call in the speciation of anuran amphibians. *Amer. Nat.* 92:27–51.
- . 1958c. Call structure and species groups in U.S. treefrogs (*Hyla*). *Southwest. Nat.* 3:77–89.
- . 1962. Non-morphological data in anuran classification. *Syst. Zool.* 11:72–84.
- and M.J. Littlejohn. 1960. Stage of speciation of two allopatric populations of chorus frogs (*Pseudacris*). *Evolution* 14:82–87.
- Blouin, M.S. 1989a. Life history correlates of a color polymorphism in the Ornate Chorus Frog, *Pseudacris ornata*. *Copeia* 1989:319–325.
- . 1989b. Inheritance of a naturally occurring color polymorphism in the Ornate Chorus Frog, *Pseudacris ornata*. *Copeia* 1989:1056–1059.
- Boulenger, G.A. 1882. Catalogue of the Batrachia and Salientia in the Collection of the British Museum, 2nd edition. Trustees of the British Museum, London.
- Brandt, B.B. 1936. The frogs and toads of eastern North Carolina. *Copeia* 1936:215–223.
- . 1953. Salientia of Bleckley County, Georgia, and vicinity. *Herpetologica* 9:141–145.
- and C.F. Walker. 1933. A new species of *Pseudacris* from the southeastern United States. *Occas. Pap. Mus. Zool. Univ. Michigan* (272):1–7.
- Brown, J.S. 1956. The Frogs and Toads of Alabama. Ph.D. Diss., Univ. Alabama, Tuscaloosa.
- Brown, L.E. and D.B. Means. 1984. Fossorial behaviour and ecology of the chorus frog *Pseudacris ornata*. *Amphib.-Rept.* 5:261–273.
- Burger, J. and J.W. Snodgrass. 2000. Oral deformities in several species of frogs from the Savannah River Site, USA. *Environ. Chem. Toxicol.* 19: 2519–2524.
- Burt, C.E. 1938. The frogs and toads of the southeastern United States. *Trans. Kansas Acad. Sci.* 41:331–367.
- Caldwell, J.P. 1987. Demography and life history of two species of chorus frogs (Anura: Hylidae) in South Carolina. *Copeia* 1987:114–127.
- Carmichael, P. and W. Williams. 2000. Florida's Fabulous Reptiles and Amphibians. World Publ., Tampa, Florida.
- Carr, A.F., Jr. 1940a. Dates of frog choruses in Florida. *Copeia* 1940:55.
- . 1940b. A contribution to the herpetology of Florida. *Univ. Florida Publ., Biol. Sci.* 3:1–118.
- Carr, K.M. and R. Altig. 1992. Configurations of the rectus abdominis muscle of anuran tadpoles. *J. Morphol.* 214:351–356.
- Chantell, C.J. 1968. The osteology of *Pseudacris* (Amphibia: Hylidae). *Amer. Midl. Nat.* 80:381–391.
- Chermock, R.L. 1952. A key to the amphibians and reptiles of Alabama. *Geol. Surv. Alabama, Mus. Pap.* (33):1–88.
- Cliburn, J.W. 1970. A key to the amphibians and reptiles of Mississippi with guides to their study. 3rd rev. ed. Mississippi Game Fish Comm, St. Wildl. Mus., Jackson.
- Cloninger, P. and J. Camper. 2005. A herpetofaunal survey of Long Leaf Pine Heritage Preserve. *Bull. So. Carolina Acad. Sci.* 67:68.
- Cochran, D.M. 1961. *Living Amphibians of the World*. Doubleday, Garden City, New York.
- Cocroft, R.B. 1994. A cladistic analysis of chorus frog phylogeny (Hylidae: *Pseudacris*). *Herpetologica* 50:420–437.
- and M.J. Ryan. 1995. Patterns of advertisement call evolution in toads and chorus frogs. *Anim. Behav.* 49:283–303.
- Collins, J.T. and T.W. Taggart. 2002. Standard common and current scientific names for North American amphibians, turtles, reptiles and crocodylians. Fifth ed. Center North Amer. Herpetol., Lawrence, Kansas.
- Conant, R. and J.T. Collins. 1991. *A Field Guide to Reptiles and Amphibians of Eastern and Central North America*. Third ed. Houghton Mifflin Co., Boston.
- Cope, E.D. 1875. Check-list of North American Batrachia and Reptilia; with a systematic list of the higher groups and an essay on geographic distribution. Based on the specimens contained in the U.S. National Museum. *Bull. U.S. Natl. Mus.* (1): 1–104.
- . 1889. Batrachia of North America. *Bull. U.S. Natl. Mus.* (34):1–525.
- Corrington, J.D. 1929. Herpetology of the Columbia, South Carolina, Region. *Copeia* 1929:58–83.
- Cromer, R.B., J.D. Lanham, and H.H. Hanlin. 2002. Herpetofaunal response to gap and skidder-rut wetland creation in a southern bottomland hardwood forest. *For. Sci.* 48:407–413.
- Crother, B.I., J. Boundy, J.A. Campbell, K. de Quieroz, D.R. Frost, R. Highton, J.B. Iverson, P.A. Meylan, T.W. Reeder, M.E. Seidel, J.W. Sites, Jr., T.W. Taggart, S.G. Tilley, and D.B. Wake. 2000. Scientific and standard English names of amphibians and reptiles of North America north of Mexico, with comments regarding confidence in our understanding. *SSAR Herpetol. Circ.* (29):iii + 82 p.
- da Silva, H.R. 1997. Two character states new for hylines and the taxonomy of the genus *Pseudacris*. *J. Herpetol.* 31:609–613.
- Daszak, P., D.E. Scott, A.M. Kilpatrick, C. Faggioni, J.W. Gibbons, and D. Porter. 2005. Amphibian population declines at Savannah River Site are linked to climate, not chytridiomycosis. *Ecology* 86:3232–3237.
- Deckert, R.F. 1915. Concluding notes on the Salientia of Jacksonville, Fla. *Copeia* (20):21–24.
- Degner, J.F., T.D. Hether, and E.A. Hoffman. 2009. Eight novel tetranucleotide and five cross-species dinucleotide microsatellite loci for the Ornate Chorus Frog (*Pseudacris ornata*). *Mol. Ecol. Resources* 9:622–624.
- Depkin, F.C., M.C. Coulter, and A.L. Bryan, Jr. 1992. Food of nestling Wood Storks in east-central Georgia. *Col. Waterbirds* 15:219–225.

- Dickerson, M.C. 1907. *The Frog Book*. Doubleday, Page and Co., New York.
- Dodd, C.K., Jr., W.J. Barichivich, S.A. Johnson, and J.S. Staiger. 2007. Changes in a northwestern Florida Gulf Coast herpetofaunal community over a 28-y period. *Amer. Midl. Nat.* 158:29–48.
- Doherty, J.A. and H.C. Gerhardt. 1984. Evolutionary and neurobiological implications of selective phototaxis in the Spring Peeper (*Hyla crucifer*). *Anim. Behav.* 32:875–881.
- Dorcas, M.E., S.J. Price, and G.E. Vaughan. 2006. Amphibians and reptiles of the Great Falls bypassed reaches in South Carolina. *J. North Carolina Acad. Sci.* 122:1–9.
- Dubois, A. 1984. *Miscellanea nomenclatorica batrachologica* (III). *Alytes* 3:85–89.
- Duellman, W.E. (ed.). 1999. *Patterns of Distribution of Amphibians: A Global Perspective*. Johns Hopkins Univ. Press, Baltimore, Maryland.
- Dundee, H.A. and D.A. Rossman. 1989. *The Amphibians and Reptiles of Louisiana*. Louisiana St. Univ. Press, Baton Rouge.
- Eason, G.W. and J.E. Fauth. 2001. Ecological correlates of anuran species richness in temporary pools: a field study in South Carolina, USA. *Israel J. Zool.* 47:347–365.
- Einem, G.E. and L.D. Ober. 1956. The seasonal behavior of certain Floridian Salientia. *Herpetologica* 12:205–212.
- Enge, K.M. 2001. The pitfalls of pitfall traps. *J. Herpetol.* 35:467–478.
- Faivovich, J., C.F.B. Haddad, P.C.A. Garcia, D.R. Frost, J.A. Campbell, and W.C. Wheeler. 2005. Systematic review of the frog family Hylidae, with special reference to the Hylinae: phylogenetic analysis and taxonomic revision. *Bull. Amer. Mus. Nat. Hist.* (294):1–240.
- Fanning, S.A. 1966. *A Synopsis and Key to the Tadpoles of Florida*. M.S. Thesis, Florida St. Univ., Tallahassee.
- Foley, P. 2000. Problems in extinction model selection and parameter estimation. *Environ. Manag.* 26:S55–S73.
- Frank, N. and E. Ramus. 1995. *A Complete Guide to Scientific and Common Names of Reptiles and Amphibians of the World*. N G Publ., Inc., Pottsville, Pennsylvania.
- Frost, D.R. (ed.). 1985. *Amphibian Species of the World: A Taxonomic and Geographical Reference*. Allen Press, Lawrence, Kansas.
- Gaudin, A.J. 1969. *A Comparative Study of the Osteology and Evolution of the Holarctic Tree Frogs: Hyla, Pseudacris, Acris, and Limnaeodius*. Ph.D. Diss., Univ. So. California, Los Angeles.
- . 1973. Species groups of North American chorus frogs (genus *Pseudacris*: family Hylidae). *Bull. So. California Acad. Sci.* 72:49–50.
- . 1974. An osteological analysis of Holarctic tree frogs, family Hylidae. *J. Herpetol.* 8:141–152.
- Gerhardt, H.C. 1973. Reproductive interactions between *Hyla crucifer* and *Pseudacris ornata*. *Amer. Midl. Nat.* 89:81–88.
- Gibbons, J.W. and D.H. Bennett. 1974. Determination of anuran terrestrial activity patterns by a drift fence method. *Copeia* 1974:236–243.
- and J.W. Coker. 1978. Herpetofaunal colonization patterns of Atlantic coast barrier islands. *Amer. Midl. Nat.* 99:219–233.
- and R.D. Semlitsch. 1981. Terrestrial drift fences with pitfall traps: an effective technique for quantitative sampling of animal populations. *Brimleyana* (7):1–16.
- and –. 1991. *Guide to Reptiles and Amphibians of the Savannah River Site*. Univ. Georgia Press, Athens.
- , C.T. Winne, D.E. Scott, J.D. Willson, X. Glaudas, K.M. Andrews, B.D. Todd, L.A. Fedewa, L. Wilkinson, R.N. Tsaliagos, S.J. Harper, J.L. Greene, T.D. Tuberville, B.S. Metts, M.E. Dorcas, J.P. Nestor, C.A. Young, T. Akre, R.N. Reed, and K.A. Buhmann. 2006. Remarkable amphibian biomass and abundance in an isolated wetland: Implications for wetland conservation. *Conserv. Biol.* 20:1457–1465.
- Goin, C.J. 1958. Notes on the maxillary dentition of some hylid frogs. *Herpetologica* 14:117–121.
- Goin, O.B., C.J. Goin, and K. Bachmann. 1968. DNA and amphibian life history. *Copeia* 1968:532–540.
- Green, D.M. and S.K. Sessions (eds.). 1991. *Amphibian Cytogenetics and Evolution*. Academic Press, San Diego, California.
- Gregoire, D.R. 2005. *Tadpoles of the Southeastern United States Coastal Plain*. U.S. Geol. Surv. Rep., Florida Integr. Sci. Center.
- Günther, A. 1859 (“1858”). *Catalogue of the Batrachia and Salientia in the Collection of the British Museum*. Trustees of the British Museum, London.
- . 1885–1902. *Biologia Centrali-Americana. Reptilia and Batrachia*. R.H. Porter and Dulau and Co., London.
- Hailman, J.P. and R.G. Jaeger. 1974. Phototactic responses to spectrally dominant stimuli and use of colour vision by adult anuran amphibians: a comparative survey. *Anim. Behav.* 22:757–795.
- Hanlin, H.G., F.D. Martin, L.D. Wike, and S.H. Bennett. 2000. Terrestrial activity, abundance and species richness of amphibians in managed forests in South Carolina. *Amer. Midl. Nat.* 143:70–83.
- Harkey, G.A. and R.D. Semlitsch. 1988. Effects of temperature on growth, development, and color polymorphism in the Ornate Chorus Frog *Pseudacris ornata*. *Copeia* 1988:1001–1007.
- Harper, F. 1931. Notes on two Georgia species of *Pseudacris*. *Copeia* 1931:159–161.
- . 1937. A season with Holbrook’s Chorus Frog (*Pseudacris ornata*). *Amer. Midl. Nat.* 18:260–272.
- Hayes, J.P. and R.J. Steidl. 1997. Statistical power analysis and amphibian population trends. *Conserv. Biol.* 11:273–275.
- Hedges, S.B. 1986. An electrophoretic analysis of Holarctic hylid frog evolution. *Syst. Zool.* 35:1–21.
- Highton, R. 1991. Molecular phylogeny of plethodontine salamanders and hylid frogs: statistical analysis of protein comparisons. *Mol. Biol. Evol.* 8:

- 796–818.
- Hoffman, E.A. and M.S. Blouin. 2000. A review of colour and pattern polymorphisms in anurans. *Biol. J. Linn. Soc.* 70:633–665.
- Holbrook, J.S. 1836. *North American Herpetology; or, a Description of the Reptiles Inhabiting the United States*, Vol. I. J. Dobson, Philadelphia, Pennsylvania.
- . 1842. *North American Herpetology: or, a Description of the Reptiles Inhabiting the United States*, 2nd ed., Vol. IV. J. Dobson, Philadelphia, Pennsylvania.
- Holman, J.A. 1959. Amphibians and reptiles from the Pleistocene (Illinoian) of Williston, Florida. *Copeia* 1959:96–102.
- . 1995. *Pleistocene Amphibians and Reptiles of North America*. Oxford Univ. Press, New York.
- . 2003. *Fossil Frogs and Toads of North America*. Indiana Univ. Press, Bloomington.
- Hulbert, R.C. and A.E. Pratt. 1998. New Pleistocene (Rancholabrean) vertebrate faunas from coastal Georgia. *J. Vert. Paleontol.* 18:412–429.
- Hunsaker II, D. and C. Johnson. 1959. Internal pigmentation and ultraviolet transmission of the integument in amphibians and reptiles. *Copeia* 1959: 311–315.
- Jaeger, R.G. and J.P. Hailman. 1973. Effects of intensity on the phototactic responses of adult anuran amphibians: A comparative survey. *Z. Tierpsychol.* 33:352–407.
- Jameson, D.L. and R.C. Richmond. 1971. Parallelism and convergence in the evolution of size and shape in holarctic *Hyla*. *Evolution* 25:497–508.
- Jensen, J.B. 2005. *Pseudacris ornata*, p. 477–478. In M.J. Lannoo (ed.), *Declining Amphibians: The Conservation Status of United States Species*. Univ. California Press, Berkeley.
- . 2008. *Pseudacris ornata*, Ornate Chorus Frog. In J.B. Jensen and C. Camp (eds.), *The Amphibians and Reptiles of Georgia*. Univ. Georgia Press, Athens.
- Jobson, H.G.M. 1940. Reptiles and amphibians from Georgetown County, South Carolina. *Herpetologica* 2:39–43
- Le Conte, J.E. 1855. Descriptive catalogue on the ranina of the United States. *Proc. Acad. Nat. Sci. Philadelphia* 7:423–431.
- Lemmon, E.C.M. 2007. *Patterns and Processes of Speciation in North American Chorus Frogs (Pseudacris)*. Ph.D. Diss., Univ. Texas Austin.
- , A.R. Lemmon, and D.C. Cannatella. 2007a. Geological and climatic forces driving speciation in the continentally distributed trilling chorus frogs (*Pseudacris*). *Evolution* 61:2086–2103.
- , –, J.T. Collins, J.A. Lee-Yaw, and D.C. Cannatella. 2007b. Phylogeny-based delimitation of species boundaries and contact zones in the trilling chorus frogs (*Pseudacris*). *Mol. Phylo. Evol.* 44: 1068–1082.
- Leviton, A. 1972. *Reptiles and Amphibians of North America*. Doubleday and Co., Inc., New York.
- Liner, A.E., L.L. Smith, S.W. Golladay, S.B. Castleberry, and J.W. Gibbons. 2008. Amphibian distributions within three types of isolated wetlands in southwest Georgia. *Amer. Midl. Nat.* 160:69–81.
- Littlejohn, M.J. 1958. Mating behavior in the treefrog, *Hyla versicolor*. *Copeia* 1958:222–223.
- Liu, C.C. 1935. The 'Linea masculina,' a new secondary sex character in Salientia. *J. Morphol.* 57: 131–145.
- Livezey, R.L. and A.H. Wright. 1947. A synoptic key to the Salientian eggs of the United States. *Amer. Midl. Nat.* 37:179–222.
- Lohoefer, R. and R. Altig. 1983. *Mississippi herpetology*. Mississippi St. Univ. Res. Center Bull. (1):vi + 66 p.
- Luhring, T.M. 2007. Reptiles and amphibians of Boy Scout Camp Linwood-Hayne: results from an undergraduate-initiated three year opportunistic inventory. *Georgia J. Sci.* 65: 104–111.
- Lynch, J.D. 1965. The Pleistocene amphibians of Pit II, Arredondo, Florida. *Copeia* 1965:72–77.
- Martof, B.S. 1961. Vocalization as an isolating mechanism in frogs. *Amer. Midl. Nat.* 65:118–126.
- , W.M. Palmer, J.R. Bailey, and J.R. Harrison, III. 1980. *Amphibians and Reptiles of the Carolinas and Virginia*. Univ. North Carolina Press, Chapel Hill.
- Maxson, L.R. and A.C. Wilson. 1975. Albumin evolution and organismal evolution in tree frogs (Hylidae). *Syst. Zool.* 24:1–15.
- Means, D.B. and H.W. Campbell. 1981. Effects of prescribed burning on amphibians and reptiles, p. 89–97. In G.W. Wood (ed.), *Prescribed Fire and Wildlife in Southern Forests*. Belle W. Baruch For. Sci. Inst., Georgetown, South Carolina.
- , C.K. Dodd, Jr., S.A. Johnson, and J.G. Palis. 2004. Amphibians and fire in Longleaf Pine ecosystems: response to Schurbon and Fauth. *Conserv. Biol.* 18:1149–1153.
- and D. Simberloff. 1987. The Peninsula Effect: habitat-correlated species decline in Florida's herpetofauna. *J. Biogeogr.* 14:551–568.
- Mecham, J.S. 1957. Some hybrid combinations between Strecker's Chorus Frog, *Pseudacris streckeri*, and certain related forms. *Texas J. Sci.* 9:337–344.
- . 1959. Experimental evidence on the relationships of two allopatric chorus frogs of the genus *Pseudacris*. *Texas J. Sci.* 11:343–347.
- . 1965. Genetic relationships and reproductive isolation in southeastern frogs of the genera *Pseudacris* and *Hyla*. *Amer. Midl. Nat.* 74:269–308.
- Millsap, B.A., J.A. Gore, D.E. Runde, and S.I. Cerulean. 1990. Setting priorities for the conservation of fish and wildlife species in Florida. *Wildl. Monogr.* (111):3–57.
- Mittleman, M.B. and J.C. List. 1953. The generic differentiation of the swamp treefrogs. *Copeia* 1953: 80–83.
- Moler, P.E. 1983. Winter serenade. *Florida Wildl.* 36(5):18–23.
- Mount, R.H. 1975. *The Reptiles and Amphibians of Alabama*. Agric. Exp. Sta., Auburn Univ., Auburn, Alabama.
- Moriarty, E.C. and D.C. Cannatella. 2004. Phylo-

- genetic relationships of the North American chorus frogs (*Pseudacris*: Hylidae). *Mol. Phylo. Evol.* 30:409–420.
- Moseley, K.R., S.B. Castleberry, and S.H. Schweitzer. 2003. Effects of prescribed fire on herpetofauna in bottomland hardwood forests. *Southeast. Nat.* 2:475–486.
- Murphy, J.C. 1979. *Pseudacris streckeri*, a small frog with an interesting history. *Bull. Chicago Herpetol. Soc.* 14:120–129.
- Neill, W.T. 1952. Burrowing habits of *Hyla gratiosa*. *Copeia* 1952:196.
- . 1957. Notes on metamorphic and breeding aggregations of the Southern Spadefoot, *Scaphiopus holbrooki* (Harlan). *Herpetologica* 13:185–187.
- Noble, G.K. 1923. The generic and genetic relations of *Pseudacris*, the swamp tree frogs. *Amer. Mus. Novitates* (70):1–6.
- Obst, F.J., K. Richter, and U. Jacob. 1988. The Completely Illustrated Atlas of Reptiles and Amphibians for the Terrarium. T.F.H Publ., Inc., Neptune City, New Jersey.
- Olalla-Tárraga, M.Á. and M.Á. Rodríguez. 2007. Energy and interspecific body size patterns of amphibian faunas in Europe and North America: anurans follow Bergmann's rule, urodeles its converse. *Global Ecol. Biogeogr.* 16:606–617.
- Orton, G.L. 1952. Key to the genera of tadpoles in the United States and Canada. *Amer. Midl. Nat.* 47:382–395.
- Owens, A.K., K.R. Moseley, T.S. McCay, S.B. Castleberry, J.C. Kilgo, and W.M. Ford. 2008. Amphibian and reptile community response to coarse woody debris manipulations in upland Loblolly Pine (*Pinus taeda*) forests. *Forest Ecol. Manag.* 256:2078–2083.
- Palis, J. 1995. Winter chorus. *Florida Wildl.* 49(1):12–14.
- and M.J. Aresco. 2007. Immigration orientation and migration distance of four pond-breeding amphibians in northwestern Florida. *Florida Sci.* 70:251–263.
- Paukstis, G.L. and L.E. Brown. 1987. Evolution of the intercalary cartilage in chorus frogs, genus *Pseudacris* (Salientia: Hylidae). *Brimleyana* 13:55–61.
- and –. 1991. Evolutionary trends in the morphology of the intercalary phalanx of anuran amphibians. *Can. J. Zool.* 69:1297–1301.
- Pechmann, J.H.K. and R.D. Semlitsch. 1986. Diel activity pattern in the breeding migrations of winter-breeding anurans. *Can. J. Zool.* 64:1116–1120.
- , D.E. Scott, J.W. Gibbons, and R.D. Semlitsch. 1989. Influence of wetland hydroperiod on diversity and abundance of metamorphosing juvenile amphibians. *Wetlands Ecol. Manag.* 1:3–11.
- , R.D. Semlitsch, J.P. Caldwell, L.J. Vitt, and J.W. Gibbons. 1991. Declining amphibian populations: the problem of separating human impacts from natural fluctuations. *Science* 253:892–895.
- , R.A. Estes, D.E. Scott, and J.W. Gibbons. 2001. Amphibian colonization and use of ponds created for trial mitigation of wetland loss. *Wetlands* 21:93–111.
- Pinkowski, B. 1993. LPC spectral moments for clustering acoustic transients. *IEEE Trans. Speech Audio Processing* 1:362–368
- Porter, K.R. 1972. *Herpetology*. W.B. Saunders Co., Philadelphia.
- Powell, R., J.T. Collins, and E.D. Hooper, Jr. 1998. *A Key to Amphibians and Reptiles of the Continental United States and Canada*. Univ. Press of Kansas, Lawrence.
- Reed, J.M. and A.R. Blaustein. 1995. Assessment of "nondeclining" amphibian populations using power analysis. *Conserv. Biol.* 9:1299–1300
- Reichling, S.B. 2008. *Reptiles and Amphibians of the Southern Pine Woods*. Univ. Press Florida, Gainesville.
- Richmond, E.A. 1968. A supplement to the fauna and flora of Horn Island, Mississippi. *Gulf Res. Rep.* 2-3:213–254.
- Robinson, E.J., Jr. 1954. Notes on the occurrence and biology of filarial nematodes in southwestern Georgia. *J. Parasitol.* 40:138–147.
- Russell, D.A., F.J. Rich, V. Schneider, and J. Lynch-Stieglitz. 2009. A warm thermal enclave in the Late Pliocene of the south-eastern United States. *Biol. Rev.* 84:173–202.
- Sanchiz, B. 1998. *Encyclopedia of palaeoherpetology*, Part 4. Salientia. Pfeil, München.
- Sasa, M.M., P.T. Chippindale, and N.A. Johnson. 1998. Patterns of postzygotic isolation in frogs. *Evolution* 52:1811–1820.
- Schmid, M. 1978. Chromosome banding in Amphibia I. Constitutive heterochromatin and nucleolus organizer regions in *Bufo* and *Hyla*. *Chromosoma* 66:361–388.
- Schmidt, K.P. 1953. *A check list of North American amphibians and reptiles*. 6th ed. Univ. Chicago Press, Illinois.
- Schurbon, J.M. 2000. *Effects of Prescribed Burning on Amphibian Diversity in the Francis Marion National Forest, South Carolina*. M.S. Thesis, Univ. Charleston, Charleston, South Carolina.
- and J.E. Fauth. 2003. Effects of prescribed burning on amphibian diversity in a southeastern U.S. National Forest. *Conserv. Biol.* 17:1338–1349.
- and –. 2004. Fire as friend and foe of amphibians: a reply. *Conserv. Biol.* 18:1156–1159.
- Schwartz, A. 1957. Chorus frogs (*Pseudacris nigrita* LeConte) in South Carolina. *Amer. Mus. Novitates* (1838):1–12.
- Sekerak, C.M., G.W. Tanner, and J.G. Palis. 1996. Ecology of flatwoods salamander larvae in breeding ponds in Apalachicola National Forest. *Proc. Ann. Conf. Southeast. Assoc. Fish Wildl. Agen.* 50:321–330.
- Semlitsch, R.D. and J.R. Bodie. 2003. Biological criteria for buffer zones around wetlands and riparian habitats for amphibians and reptiles. *Conserv. Biol.* 17:1219–1228.
- , D.E. Scott, J.H.K. Pechmann, and J.W. Gibbons. 1996. Structure and dynamics of an amphibian community. Evidence from a 16-year study of a natural pond, p. 217–248. *In* M.L. Cody and J.A.

- Smallwood (eds.), Long-Term Studies of Vertebrate Communities. Academic Press, San Diego.
- Seyle, C.W., Jr. and S.E. Trauth. 1982. Life history notes. *Pseudacris ornata* (Ornate Chorus Frog). Reproduction. Herpetol. Rev. 13:45.
- Siekmann, J.M. 1949. A Survey of the Tadpoles of Louisiana. M.S. Thesis, Tulane Univ., New Orleans, Louisiana.
- Smith, L.L., D.A. Steen, J.M. Stober, M.C. Freeman, S.W. Golladay, L.M. Conner, and J. Cochrane. 2006. The vertebrate fauna of Ichauway, Baker County, GA. Southeast. Nat. 5:599–620
- Smith, S.A., P.R. Stephens, and J.J. Wiens. 2005. Replicate patterns of species richness, historical biogeography, and phylogeny in Holarctic treefrogs. Evolution 59:2433–2450.
- Snodgrass, J.W., A.L. Bryan, Jr., and J. Burger. 2000. Development of expectations of larval amphibian assemblage structure in southeastern depression wetlands. Ecol. Appl. 10:1219–1229.
- Stejneger, L.H., and T. Barbour. 1917. A Check List of North American Amphibians and Reptiles. Harvard Univ. Press, Cambridge.
- Thompson, E.F., Jr. and B.S. Martof. 1957. A comparison of the physical characteristics of frog calls (*Pseudacris*). Physiol. Zool. 30:328–341.
- Todd, B.D., T.M. Luhring, B.B. Rothermel, and J.W. Gibbons. 2009. Effects of forest removal on amphibian migrations: implications for habitat and landscape connectivity. J. Appl. Ecol. 46:554–561.
- and C.T. Winne. 2006. Ontogenetic and interspecific variation in timing of movement and responses to climatic factors during migrations by pond-breeding amphibians. Can. J. Zool. 84:715–722.
- Travis, J. 1981. A key to the tadpoles of North Carolina. Brimleyana 6:119–127.
- and J.C. Trexler. 1984. Investigations on the control of the color polymorphism in *Pseudacris ornata*. Herpetologica 40:252–257.
- . 2006. Is it what we know or who we know? Choice of organism and robustness of inference in ecology and evolutionary biology. Am. Nat. 167: 303–314.
- Tuberville, T.D., J.D. Willson, M.E. Dorcas, and J.W. Gibbons. 2005. Herpetofaunal species richness of southeastern National Parks. Southeast. Nat. 4:537–569.
- Van Hyning, O.C. 1933. Batrachia and Reptilia of Alachua County, Florida. Copeia 1933:3–7.
- Viosca, P., Jr. 1938. Notes on the winter frogs of Alabama. Copeia 1938:201.
- Walton, A.C. 1946. Parasites of the Hylidae (Amphibia: Hylinae). II. J. Parasitol. 32 (Suppl.):19.
- Warner, S.C. and W.A. Dunson. 1998. The effect of low pH on amphibians breeding in temporary ponds in north Florida. Florida Game Fresh Water Fish Comm. Final Rep., Tallahassee.
- Wever, E.G. 1985. The Amphibian Ear. Princeton Univ. Press, Princeton, New Jersey.
- Wiens, J.J., J.W. Fetzner, Jr., C.L. Parkinson, and T.W. Reeder. 2005. Hylid frog phylogeny and sampling strategies for speciose clades. Syst. Biol. 54:778–807.
- Wiley, J.E. 1982. Chromosome banding patterns of tree frogs (Hylidae) of the eastern USA. Herpetologica 38:507–520.
- Wright, A.H. 1926. The vertebrate life of Okefinokee Swamp in relation to the Atlantic Coastal Plain. Ecology 7:77–95.
- . 1932. Life-histories of the Frogs of Okefinokee Swamp, Georgia. Macmillan, New York.
- and A.A. Wright. 1949. Handbook of Frogs and Toads of the United States and Canada. 3rd ed. Comstock Publ., Ithaca, New York.
- Yarrow, H.C. 1882. Check list of North American Reptilia and Batrachia, with catalogue of specimens in U.S. National Museum. Bull. U.S. Natl. Mus. (24): v +[i] + 249 p.
- Yeh, J. 2002. The effect of miniaturized body size on skeletal morphology in frogs. Evolution 56:628–641.
- Zim, H.S. and H.M. Smith. 1956. Reptiles and Amphibians. A Guide to Familiar American Species. Golden Nature Guide, Simon and Schuster, New York.

Brad M. Glorioso, IAP World Services, Inc., U.S. Geological Survey National Wetlands Research Center, 700 Cajundome Blvd., Lafayette, LA, 70506, USA (gloriosob@usgs.gov).

Primary editors for this account, Andrew H. Price and Twan Leenders.

Published 15 January 2010 and Copyright © 2010 by the Society for the Study of Amphibians and Reptiles.
