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*Hyla avivoca* Viosca  
Bird-voiced treefrog

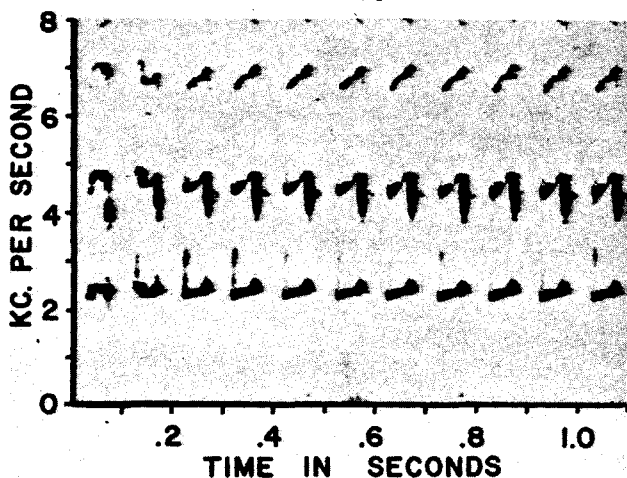
*Hyla avivoca* Viosca, 1928:89. Type-locality, "outskirts of Mandeville, [St. Tammany Parish], Louisiana." Holotype, U. S. Natl. Mus. 75017, adult male, collected 12 June 1926 by Percy Viosca, Jr.

• CONTENT. Two subspecies are recognized: *avivoca* and *ogechiensis*.

• DEFINITION and DIAGNOSIS. Adult males of this *Hyla* attain a snout-vent length of 38 mm, sexually mature females attain 53 mm. Metachrosis is well developed, the ground color ranging from green through various shades of gray to almost black. The pattern consists of a dark, asymmetrical dorsal blotch; dark crossbars on the limbs; and dark markings between the eyes. A prominent suborbital light spot is present on each side of the head. Color and pattern features are exceedingly similar to those of *Hyla versicolor*, from which *H. avivoca* differs in having a wash of green, pale yellow, or white (rather than yellow-orange) in the reticulate pattern of the groin and postfemora, a smoother skin, greater slenderness, proportionately larger eye, and usually a divided (rather than simple) subarticular pustule on the outer finger of the hand.

• DESCRIPTIONS and ILLUSTRATIONS. Eggs and tadpoles have been described and illustrated by Parker (1951) and Hellman (1953), and an excellent account of the embryonic and larval development with numerous illustrations has been published by Volpe *et al.* (1961). Descriptions of the adult without illustrations appear in Mittleman (1945), Neill (1948), and Smith (1953). Descriptions with illustrations of the adult may be found in Viosca (1928, figs. 1-5), Harper (1933, pl. 1; 1935, fig. 10), Wright & Wright (1949, pl. 62), Parker (1939, fig. 4), and Smith (1961, fig. 72). A colored illustration is provided by Conant (1958, pl. 39). The chromosomes are figured by Bushnell *et al.* (1939), who show cytological differences between *H. avivoca* and *H. versicolor*. An audiospectrogram of the call is shown by Blair (1958, fig. 1), and its call is included in the record album "Voices of the Night, 2nd ed." (Comstock Publ. Co., Ithaca, New York).

• DISTRIBUTION. *Hyla a. avivoca* is found in the Mississippi River and Gulf Coast drainage systems and *H. a. ogechiensis* in the Atlantic Coast drainage system. The species occurs discontinuously from Aiken, Barnwell, and Allendale Counties, South Carolina, west across Georgia (Neill, 1948:179) and Alabama (Chermock, 1952:37; Brown, MS:132-140; J. S. Mecham, pers. comm.) south of the Fall Line, but it is absent from the lower Atlantic Coastal Plain of both South Carolina and Georgia (Neill, 1948:179). It occurs in the panhandle of Florida (Carr, 1940:58 and Neill, pers. comm.) and in suit-



AUDIOSPECTROGRAM. Shown is a portion of the call of *Hyla avivoca*, Perry County, Mississippi, 27 July 1956, air 25°, water 30°C. (Courtesy W. F. Blair.)

able habitats throughout Mississippi (Ferguson, 1961:391 and pers. comm.; W. E. Brode and J. E. Woods, pers. comms.) and the Florida Parishes of Louisiana, ascending the Mississippi River valley through western Tennessee (Gentry, 1955:175) and western Kentucky (Barbour, 1956:82; J. C. List, pers. comm.) to extreme southern Illinois (Smith, 1961:87). The northernmost record for *H. avivoca* (Henderson Co., Kentucky) is reported by Dury & Gessing (1940:31). R. Dury (pers. comm., 11 Dec. 1956) recalled that "they were collected singing along with hundreds of *Hyla cinerea*." However, *H. cinerea* does not occur in Henderson County and, although the Dury & Gessing frogs are indeed *H. avivoca*, their provenance remains in doubt.

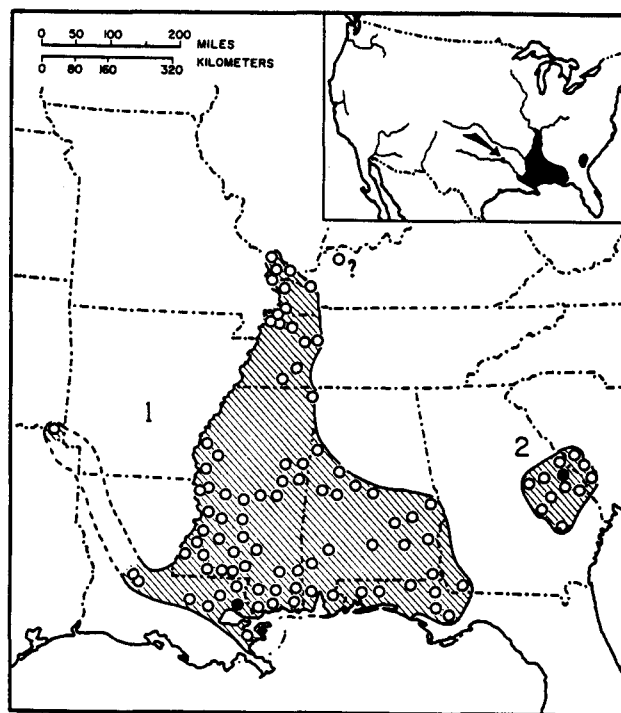
Conant (1958:348), on the authority of the late Paul Anderson, depicted the species range as including southeastern Missouri and northeastern Arkansas, despite the absence of records. I have failed to find *H. avivoca* in southeastern Missouri on the same nights that I saw and heard numerous individuals in Illinois and doubt its occurrence in Missouri. The only known trans-Mississippi River records are McCurtain County, Oklahoma (Blair & Lindsay, 1961:202) and Rapides and Evangeline parishes in Louisiana (Fouquette & Delahoussaye, 1966), although the latter authors predicted that the species might be found eventually in the same drainage (Red River) of southwestern Arkansas and northeast Texas.

*Hyla avivoca* evidently is sporadic in occurrence throughout most of its range and restricted to large-river swamps.

• FOSSIL RECORD. None.

• PERTINENT LITERATURE. Most of the references cited in DESCRIPTIONS and ILLUSTRATIONS, DISTRIBUTION, and REMARKS contain information on identification, general ecology, voice, and range. For discussion of natural and laboratory-induced hybridization with *H. versicolor*, see Mecham (1960); for geographic variation, Neill (1948); for nomenclatural history, Viosca (1928), Mittleman (1945), and Smith (1953).

• NOMENCLATURE HISTORY. In 1907, C. M. Barber recorded in his field notes that he collected a *Hyla* with a birdlike call, which he initially thought was a juvenile *Hyla versicolor*, at Horseshoe Lake, Alexander County, Illinois (Viosca, 1923:3). In 1917, Percy Viosca took similar specimens near Mandeville, St. Tammany Parish, Louisiana, and, upon being advised of



MAP. The solid symbols mark the type localities. Hollow symbols represent some other known localities. The question mark indicates a problematical occurrence.

the Barber specimens and notes by Karl P. Schmidt, concluded that Cope's nominal *Hyla versicolor phaeocrypta* (type-locality, Mt. Carmel, Wabash Co., Illinois) was applicable to the newly discovered species (Viosca, 1923). This prompted Ridgway (1924) to publish a boyhood recollection of having heard bird-like calls, presumably made by frogs, in the woods near Mt. Carmel, Illinois. In 1928, Viosca, after having examined the *H. v. phaeocrypta* type, concluded that it was a juvenile specimen of *H. versicolor*, and he described the bird-voiced treefrog as *Hyla avivoca* (Viosca, 1928).

In the next several years, various authors assigned the name *phaeocrypta* to presumably aberrant specimens of *H. versicolor* from such scattered regions as central Tennessee, Kansas, and Minnesota. However, Mittleman (1945) suggested that *phaeocrypta* was a senior synonym of *avivoca* and, employing biometric analysis, presented such convincing evidence that *Hyla phaeocrypta* was generally accepted as the proper name for the species. Smith (1953) reviewed the evidence and resurrected Viosca's name *H. avivoca*, although a few authors continue to use *phaeocrypta* for the species.

• **ETYMOLOGY.** The name *avivoca* combines the Latin *avis* (bird) and *vocalis* (voice) and refers to the call of the male frog. The name *ogechiensis*, of Yuchi Indian origin, is "in allusion to its [the frog's] abundance in the Ogeechee River region and its frequent occurrence in Ogeechee-lime trees (*Nyssa ogeche*)" (Neill, 1948:175).

## 1. *Hyla avivoca avivoca* Viosca Western bird-voiced treefrog

*Hyla avivoca* Viosca. See species synonymy.

*Hyla phaeocrypta phaeocrypta*: Neill, 1948:175. Recognition of subspecies.

*Hyla avivoca avivoca*: Smith, 1953:172. Resurrection of Viosca's name.

• **DEFINITION and DIAGNOSIS.** The nominate subspecies differs from the Atlantic Coastal Plain subspecies in its smaller size, adult males and females attaining snout-vent lengths of 36.5 and 49 mm, respectively, and its proportionately smaller tympanum, which averages 49 percent of the eye diameter. The reticulate pattern in the groin and concealed surfaces of the femora has a wash of green or yellow-green, and the suborbital light spot is white or pale yellow, usually without brown stippling.

## 2. *Hyla avivoca ogechiensis* Neill Eastern bird-voiced treefrog

*Hyla phaeocrypta ogechiensis* Neill, 1948:175. Type-locality, "Ogeechee River at Midville, Burke County, Georgia." Holotype, W. T. Neill 18007, adult male, collected 15 June 1948 by Wilfred T. Neill.

*Hyla avivoca ogechiensis*: Smith, 1953:172. New combination.

• **DEFINITION and DIAGNOSIS.** This subspecies differs from the preceding in its slightly larger size, adult males and females attaining known snout-vent lengths of 38.5 and 52.5 mm, and in its proportionately larger tympanum, which averages 52.5 percent of the eye diameter. The reticulate pattern in the axilla, groin, concealed surfaces of the femora (and sometimes posterior surfaces of humeri, sides, and parts of the tibia and foot) has a wash of pale greenish white or yellowish white, and the suborbital light spot is bright yellow, yellow-green, or grass green, frequently stippled with brown.

### COMMENT

Neill (1948) separated *H. a. ogechiensis* from *H. a. avivoca* on the basis of its proportionately larger tympanum; decidedly larger maximum size of the female; and several details of color and pattern in the live frogs. Smith (1953) found that the tympanum size in Illinois *H. avivoca* was somewhat closer to that of *H. a. ogechiensis* than to the mean reported for *H. avivoca* (Mittleman, 1945) and demonstrated that proportionate tympanum size is correlated with snout-vent length in certain treefrogs. He also found that *H. avivoca* is somewhat larger than had been reported and commented that the validity of *H. a. ogechiensis* was contingent upon the degree and constancy of the differences in color and pattern between the two populations. Neill (1954:82) reiterated his conviction that the color and perhaps its distribution over the frog's body were diagnostic for *H. a. ogechiensis*.

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