

Catalogue of American Amphibians and Reptiles.

GOSNER, KENNETH L., AND IRVING H. BLACK. 1967. *Hyla andersonii*.

Hyla andersonii Baird
Pine Barrens treefrog

Hyla andersonii Baird, 1854 (April): 60. Type-locality "Anderson, S. C." (Anderson, Anderson Co., South Carolina), in error. Designated by Schmidt (1953:69) as "Aiken County, South Carolina," also in error. Actual type locality unknown; see REMARKS. Holotype, U. S. Natl. Mus. 3600, collected by Miss Charlotte Paine, date unknown.

Hyla andersonii: Schmidt, 1953:69. Emendation of ending.

• CONTENT. The species is monotypic, but see REMARKS.

• DEFINITION. Adults average about 38 mm in snout to vent length. The dorsum is green with a plum-colored lateral band. The concealed surfaces of the legs are marked with bright orange.

• DESCRIPTIONS. The dorsal surface is smooth, the venter areolated. The digital pads are small, equal to about half the diameter of the tympanum. The toes are but partly webbed leaving three phalanges free on the fourth toe and two free on the remaining toes; the fingers are entirely free. The tympanum is distinct and equal to about one third the diameter of the eye. The dorsum of the body is green, unspotted, with a narrow white border, and is separated from the white venter by a dark-edged, plum colored lateral band; the axilla and normally concealed parts of the hind limbs are orange. Individuals are incapable of color change beyond tonal variations in the basic pattern.

There is sexual dimorphism in size, in the coloration of the throat and angle of the jaw, and in the glandular tissue on the thumb. Breeding males have a median, subgular, external vocal sac. Full descriptions of the adult are given by Cope (1889) and Wright (1932). The latter also summarizes different interpretations of the breeding call.

The eggs are laid singly with the vitellus measuring about 1.2-1.4 mm; there is an inner envelope 1.9-2.0 mm in diameter and an outer envelope 3.5-4.0 mm in diameter. The larvae range from about 7.1 mm at Stage 25 to about 44.0 mm at Stage 40 (Gosner 1960). The tail musculature has a well-defined dark lateral stripe that runs obliquely upward from a midlateral position at the junction of the tail and body to meet the dorsal margin of the tail musculature within its proximal half. The length of the third lower labial tooth row equals 30 per cent or more of the length of the first upper tooth row. Newly metamorphosed juveniles resemble adults in pattern and coloration. The eggs and larval development were described by Noble and Noble (1923); Gosner and Black (1957a) provided supplementary data including a

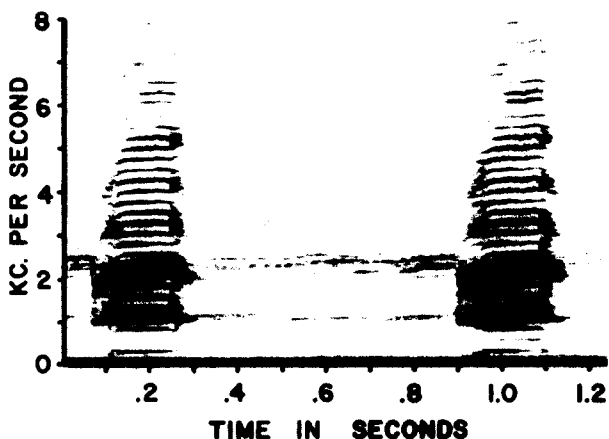


FIGURE. Audiospectrogram (narrow band, 45 cycles per second) of mating call of *Hyla andersonii*: Burlington Co., New Jersey, 13 May 1955, air 14.6°C (Amer. Mus. Nat. Hist. Dept. Herpetology tape library).

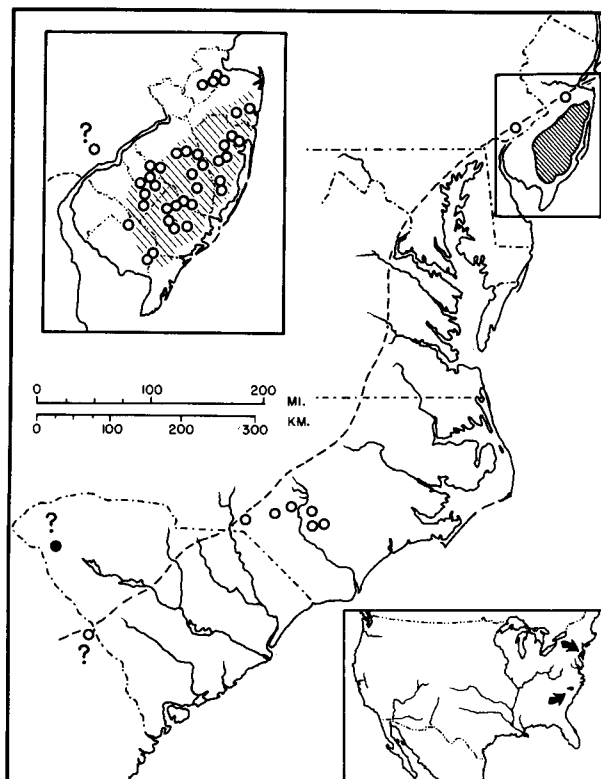
growth curve comparing total length with larval stages. See also Livezey and Wright (1947) and Wright and Wright (1949) for diagnostic keys.

Only one call is known. It is given in a "series of ten to twenty or even more, resonant, nasal notes, usually increasing in volume. Each note is a sonorous, high nasal quānk" (Noble and Noble 1923). At 24°C "the number of more or less equally expressed harmonics varies from 17 to 25, with the fundamental of the series at about 350 cps" (Blair 1958 [1959]). Refer to Bogert (1958) and to the record album "Voices of the Night, 2nd ed.," (Comstock Publ. Co., Ithaca, New York) for phonograph recordings of the mating call.

• ILLUSTRATIONS. The eggs were figured by Livezey and Wright (1947). Noble and Noble (1923) illustrated the larva, including early development of the adhesive organs, mature mouth parts, and pigmentation of the fully developed tadpole; see also Gosner and Black 1957a. Excellent color illustrations of the adult were published by Dickerson (1907) and Conant (1958). Photographs of the typical habitat were given by Noble and Noble (1923) and by Wright (1932).

• DISTRIBUTION. This species occurs in the Atlantic Coastal Plain in two widely disjunct populations in central New Jersey and North Carolina; a single individual has been reported from eastern Georgia. In New Jersey, *H. andersonii* is confined to the pine barrens in portions of all counties south of and including Monmouth County (see Conant, 1962); a minor disjunct population is definitely known from Middlesex County, N. J. and a second, somewhat questionable record exists for Delaware County, Pennsylvania (Palmer, 1908; Fowler, 1915; Netting, 1933). In North Carolina this species is recorded from Cumberland, Bladen, Moore, Richmond, and Sampson counties (Gosner and Black, 1956; Wright, 1932; Bullard, 1965). In Georgia *H. andersonii* is reported only from a single specimen from Richmond County on the upper Coastal Plain (Neill 1947).

Only the breeding habitat is known in detail. See Noble



MAP. The solid symbol marks the stated but erroneous type-locality. Open circles indicate other localities, two of which (Pennsylvania and Georgia) are questionable (see text). The broken line marks the division between coastal plain and piedmont. The shaded area indicates the extent of the pine barrens of New Jersey.

and Noble (1923) for New Jersey localities and Wright (1932), Gosner and Black (1956), and Bullard (1965) for notes on the habitat in North Carolina. Almost nothing is known of this species outside the breeding season although Neill (1948) gave the hibernating site as "beneath the bark of a standing tree."

• Fossil Record. None.

• PERTINENT LITERATURE. Wright (1932) thoroughly reviewed the literature on distribution, habitat, voice, breeding behavior, development, systematic relationships, and "general habits" to the date indicated. A number of references to *H. andersonii* give additional locality data, comment on local range problems, or give minimal information on habitat; among these are: Chamberlain (1939), Conant and Bailey (1936), Klots (1930), and Neill (1957). For a full discussion of mating behavior see Aronson (1943). Blair (1958) examined the systematic relationships of North American hylids in terms of vocal characteristics and allied *H. andersonii* with *H. cinerea*. Speculations on the zoogeographical significance of the disjunct distribution of this species were made by Gosner and Black (1956). Gosner and Black (1957b) investigated adaptive responses in early developmental stages relating to the utilization of the highly acid waters of the natural environment of *H. andersonii*. Noble and Noble (1923) and Gosner (1959) reported on food preferences of adults and larvae respectively. With regard to natural enemies, Kauffeld (1957) mentioned finding the remains of *H. andersonii* in the digestive tract of *Natrix sipedon*.

• REMARKS. The type-locality lies outside the range of the species as currently understood, and therefore its validity has been questioned by several authors (e.g., Wright, 1932; Neill, 1947). Schmidt (1953:69) revised the type locality to "Aiken County, South Carolina" without explanation, though presumably he did this because of the proximity of Aiken Co. to Richmond Co., Georgia, where Neill recorded this species. Although the identity of the specimen reported by Neill is not questioned, the presence of a population of *andersonii* so distant from the nearest occurrence in North Carolina has not been verified. In view of these considerations, designation of a type locality for *Hyla andersonii* is not warranted. Gosner and Black (1956) found statistically significant proportional differences between adults from North Carolina and New Jersey but declined a nomenclatural change.

• ETYMOLOGY. The species is named for the type-locality as supposed by Baird.

COMMENT

As an object for study this species presents several unresolved problems. Almost nothing is known of postlarval development or of the general ecology of the adult away from the breeding pools. Perhaps the most interesting aspects of the biology of this species relate to its disjunct distribution. Examination of this problem requires a general consideration of historical zoogeographic changes in the Atlantic Coastal Plain and of the ecological responses and requirements of *H. andersonii* that have sustained this fragmentation of its distribution. Any such investigation should take into account the questionable validity of disjunct records based on single occurrences and unsupported by subsequent confirmation. Where the species occurs, as for example, in the New Jersey pine barrens, it is "successful" at least in developing a numerous population and in fully exploiting the range of the habitat. Bullard's recent demonstration of a wider distribution in North Carolina than was previously known indicates the need for further searches for this species elsewhere. The easily identified larvae could be more fully exploited in filling in distribution records; the adults are secretive and even in the breeding season may be overlooked unless a persistent search is made for them. Most discoveries of *H. andersonii* are made in response to the breeding call, and in this connection it should be noted that the call of *H. andersonii* is easily confused with that of the ubiquitous *Hyla cinerea* which is widely distributed in the Atlantic Coastal Plain.

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