

Description of Newly Transformed Frogllets of the Illinois Chorus Frog (*Pseudacris streckeri illinoensis*)

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ABSTRACT

A description of naturally-occurring newly transformed frogllets of the Illinois chorus frog, *Pseudacris streckeri illinoensis*, is presented. Coloration of all frogllets is a uniform reddish brown in color with a much darker shaded tail stub. Uniform coloration is cryptic when associated with the wet sand on which the frogs emerge. Mean snout-vent length for 208 specimens averaged 19 mm with a mean tail stub length of 10 mm. Mean snout-vent length for frogs that reabsorbed the tail stub was 21 mm for 506 specimens. Snout-vent length of frogllets in this population is large compared to congeners.

INTRODUCTION

Several previous publications provide details on the life history of the Illinois chorus frog, *Pseudacris streckeri illinoensis*, including information on feeding habits (Brown, 1978), burrowing behavior (Axtell and Haskell, 1977; Brown et al., 1972; Tucker et al., 1995), distribution (Smith, 1951; 1961; 1966; Holman et al., 1964; Axtell and Haskell, 1977; Taubert et al., 1982; Gilbert, 1986; Johnson, 1987; Brown and Rose, 1988), chorus sites (Brown and Rose, 1988), fecundity (Butterfield et al., 1989), and morphological adaptations to fossorial existence (Paukstis and Brown, 1987; 1991). However, virtually nothing is known about newly transformed frogllets. This is unusual because with few exceptions the morphology of newly transformed individuals of the frogs and toads of the United States are well known (Wright and Wright, 1949). For *P. s. illinoensis*, in contrast, the only published information is the description by Smith (1951) of frogllets that transformed from tadpoles kept in the laboratory, and the mention by Smith (1961, p. 84) repeated by Johnson (1987) that "Newly transformed individuals of this subspecies are dull gray, and their dorsal pattern is inconspicuous."

Even though degree of locality-specific variation could not be studied, a description of newly transformed frogllets from a population in Madison County, Illinois is presented here along with observations on the behavior of frogllets at the natal pond. These are important because they will prove helpful in locating and recognizing frogllets of *P. s. illinoensis*. Because this frog spends much of its life buried in sandy substrates (Brown et al., 1972), surveys to locate it are difficult. Most previous surveys (Brown and Rose, 1988, for instance) depended on locating breeding choruses. The information provided in

the present paper should make surveys for newly transformed froglets easier in other portions of the frog's range. Such surveys are critical to determine the reproductive success of frogs located during surveys for breeding choruses.

METHODS

The natal pond of the newly transformed froglets that I describe is located in the NE₁ Sec. 19, T4N, R8W and is 3.1 km N junction of Sand Road and Chain of Rocks Road, Madison County, Illinois (Taubert et al., 1982). Two ponds are located in former borrow pits at this locality. Only one of the ponds produced froglets.

I used drift fences to collect the froglets. Each drift fence consisted of one 15.24 m section of aluminum flashing (0.25 m in height) with can traps to effect capture.

I measured snout-vent length (SVL = from the anterior tip of the nose to the center of the vent) and tail stub length (TSL = from the center of the vent to the posterior end of the tail) with a metric rule to the nearest mm for all froglets caught. Froglets can be arbitrarily divided into two classes. Those with a TSL > 2 mm are called newly transformed froglets whereas those with a TSL < 2 mm are called recently transformed froglets. Froglets with a TSL < 1 mm are scored as 0 TSL. A series of 13 froglets are deposited as vouchers under Illinois Department of Conservation permit number 93-8s at the Illinois Natural History Survey (INHS 10938-39; 10946-56). All other froglets were marked by toe-clipping and released shortly after capture.

RESULTS

Mean SVL for all newly transformed froglets is 19 mm (SD = 1.18, range = 16-21 mm, n = 208); for recently transformed froglets the mean SVL is 21 mm (SD = 1.21, range = 18-25 mm, n = 506). For all newly transformed froglets collected the mean TSL is 10 mm (SD = 5.24, range = 2-24 mm, n = 208).

Description Of Newly Transformed Froglets

The head is relatively massive making up a little less than one half of the SVL. The muzzle is blunt and square shaped with the mouth inclined upwards. The eyes are large making up one third of the length of the head. The distance between nares and anterior border of the eye is about equal to the width of the eye. Nares are slightly oblique and concave. They are separated by a distance about equal to their distance from the eye. The tympanum is not visible. The pupil is circular. The mouth is tadpole-like with traces of fleshy lips still remaining. The tongue is small and not obvious when the mouth is opened. The mouth opening is small being about one half the head length.

The body is inflated and round in ventral outline. The forelimbs are short but thick with short thick fingers. Their insertion into the body is obscured by folds of skin above and below the forelimbs. The hind limbs are long, thin, and about as long as the SVL. The toes are elongated and thin. They are only slightly webbed with webbing restricted to the proximal joints of the phalanges.

The coloration in life is of a nearly uniform shade of reddish brown. After preservation, areas of darker and lighter markings become apparent. These are located on top of the head, on the fore- and hind limbs, and on the sides of the body. The head markings include an inverted Y-shaped mark that interconnects the areas of the orbits and indistinct bars that extend from the anterior border of the orbit to the nares. Another indistinct blotch extends from the posterior border of the orbit towards the insertion of the forelimbs into the body. This blotch also has an anterior extension that reaches the midpoint of the orbit below the eye. The maxillary area is marked with indistinct alternating areas of lighter and darker coloration.

Markings on the body, though indistinct, include a series of 4-5 linearly arrayed sets of blotches or elongated blotches oriented along the long axis of the body. The most pronounced of these blotches lie on either side of the body at the level of the eyes beginning posterior to the inverted Y marking and continuing to the tail stub. They are irregular and may appear as blotches or stripes when not interrupted. The forelimbs are barred with three or four bars between the hand and body. One bar may be present on the hand as well. The hind limbs are also barred with six bars between foot and body. Three each of these are located on the thigh and calf. The foot has two or three bars. The posterior surface of the thigh and groin is white and translucent. The venter is unmarked and is white in color.

The tail stub is much darker than the body. In life, it appears greenish black in color with no apparent markings. After preservation, indistinct chevrons become apparent. These form V-shaped markings with the point of the V's on the ventral surface of the tail stub and with the limbs of the V's slant anteriorly.

DISCUSSION

Coloration of newly transformed froglets reported herein is similar to Smith's (1951; 1961) reports in that we both note the general absence of color pattern. However, the coloration of newly transformed froglets that I observed is brown but gray for the froglets reported by Smith. It is possible that variation in coloration is a locality-specific phenomenon because no studies of variation in coloration have been published.

The adaptive significance of the uniform coloration is readily apparent to observers experienced in looking for newly transformed froglets. At the locality I studied, newly transformed froglets are almost exactly the same coloration as the dampened sand along the pond margins. Even sitting exposed, newly transformed froglets are difficult to see against the background of dampened sand. Most individuals are not exposed but are instead rest near twigs or plant debris that littered the margins of the pond. In such cases, many newly transformed froglets became apparent only after they had moved to avoid being stepped on. Consequently, daylight searches for froglets should be concentrated where debris has collected along the pond margins whereas night searches should include areas of bare sand as well.

Once the newly transformed froglet leaves the dampened sand and enters areas of dry sand, they become readily apparent to the human observer and were easily seen along the drift fences. The conversion to the more blotched appearance of recently transformed froglets

and many of the newly transformed froglets caught away from the pond margin may be rapid because newly transformed froglets with tail stubs as long as 12 mm had already undergone this process.

I also observed three recently transformed froglets with the greenish ground color of the dorsum which Smith (1961) believed to be absent from *P. s. illinoensis* based on his examination of a small number of frogs. While this color morph can no longer be said to be absent, it certainly is not common (3 of 714, or 0.42%).

The highly unusual feature of the newly transformed froglets and recently transformed froglets that I report is their very large size (mean SVL = 19 mm) relative to frogs considered to be adults. Smith (1961) reported a specimen with a SVL of 28 mm that he called a subadult. Johnson (1987) reported SVL for adults (sex and method of determination of adult status not stated) to range between 25 and 41 mm with the largest Missouri specimen reported as 38 mm (42 mm for Illinois, Smith, 1961). Johnson's smallest adult would be included in the range of SVL for specimens caught at drift fences that I believe to be recently transformed froglets.

The newly transformed froglets that I report are much larger than newly transformed froglets that Smith (1951) reported. He reported a range of 12 to 16 mm (body length) for larvae that transformed in aquaria. It is possible that conditions of captivity caused Smith's newly transformed froglets to be relatively small. It is also possible that the large size of the newly transformed froglets that I observed is a locality-specific phenomenon as the data presented herein are the only data published concerning size at transformation for *P. s. illinoensis* based on specimens not maintained in captivity. The size at transformation is important because at least some of the froglets at the Madison County site are able to reach sexual maturity in one growth season (Tucker, 1995).

Froglets of *P. s. streckeri* are smaller at transformation. Wright and Wright (1949, p. 277) reported a range of SVL of 12 mm to 13.5 mm for *P. s. streckeri* from a Texas locality (n = 3). This is outside the range observed for *P. s. illinoensis* from Madison County but similar to those reported by Smith (1951). For *P. ornata*, Wright and Wright (1949) reported larger froglets (range = 14-19 mm, mean = 17.29, n = 19) for specimens from Florida. The latter, they considered "slightly or well past transformation" (Wright and Wright, 1949, p. 272). They overlap the low end of the range in SVL observed for recently transformed froglets from Madison County.

It is important to be able to recognize newly transformed *P. s. illinoensis*. This frog is listed as a threatened species in Illinois (Herkert, 1992), as rare in Missouri (Anonymous, 1992), as a species of special concern in Arkansas (R. Roberg, pers. comm.), and as federal candidate species (Dodd et al., 1985). Consequently throughout the range of the frog, it is important to be able to evaluate reproductive success. Most surveys conducted to locate the frog concentrate on locating breeding choruses during the early spring. Discovery of a chorus does not necessarily mean that the frogs are successfully reproducing at that locality because females may have not visited the choruses to lay eggs. Even observation of eggs does not necessarily mean the frog was successful because the eggs and tadpoles may fail to complete development. Observation of newly

transformed froglets leaving the natal pond is much better evidence for successful reproduction.

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