

OBSERVATIONS ON THE NATURAL HISTORY OF *BUFO COGNATUS* SAY*

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(ABSTRACT)

Since the spring of 1935, the habits of the Great Plains toad, *Bufo cognatus*, have been studied about Norman, intensively during its breeding and less intensively at other seasons. I offer here the essentials of the results without the supporting data and observations. A more extended account will be published elsewhere. In order that this abstract may be more useful, the bibliography includes all articles which have come to my notice which mention the habits of this species; but those which are essentially taxonomic or distributional have been omitted.

In central Oklahoma, this toad is limited to the higher portions of the prairie; it is not found in woodlands nor on the flood-plains of streams. Since, in Texas (Strecker, 1910) and in Arizona (Ruthven, 1907), it is found only in the low areas its habitat differs in various regions of its range. In drier regions (e. g., New Mexico, Arizona, and the Oklahoma Panhandle), it is not nearly so abundant as in regions of typical prairie. In Oklahoma, it has apparently not been reported east of the Oak-Hickory associates.

In habits, it is largely nocturnal but in moist weather it may appear during the day. During hot dry weather it does not appear even during the hours of darkness.

In central Oklahoma, these toads breed only after rain when the temperature is above 12° C. They utilize three types of breeding sites (1) buffalo wallows, (2) flooded grain fields, and (3) the edges of more extensive temporary pools. They do not breed in ditches, tanks in pastures, nor in streams.

Males and females differ in behavior. Males call and attempt to clasp other toads wherever there is temporary water. Females rarely enter either very shallow or deep water. If a female is clasped by a male in a shallow pool, she actively attempts to escape. If successful, she may leave the pool carrying the male with her; if unsuccessful, eggs may eventually be laid.

A congress of this species often appears in different pools on successive nights in the same general region, because the call of the male attracts other males. When males, calling about small pools or ditches, do not succeed in securing females, they often leave these situations and join other males about the larger pools. These reactions of the sexes are of distinct racial benefit, because eggs laid in water which is too shallow have little chance of survival due to high rates of evaporation.

The eggs hatch in about two days under the usual conditions of temperature. The tadpoles remain small. Calculation shows that they may number well over 700 per c. c. of water in some pools. They feed upon algae and upon softened animal and plant remains much as other bufonid larvae. They are extensively preyed upon by the larvae of the beetle, *Hydrus triangularis*, and by the tadpoles of the spadefoot, *Scaphiopus ham-*

* Contributions from the Zoological Laboratory of the University of Oklahoma, No. 198.

mondii. At metamorphosis, many of the young toads may be eaten by crows (two observations of Mr. Charles Smith which he kindly allows me to report).

The larvae metamorphose when about one and one-half months of age at a total length of just less than 30 mm. The time taken for transformation varies with individuals but usually is completed in from two to five days under natural conditions.

The young toads are distinctive in coloration. Their most conspicuous features are (1) five to eight pairs of large black or dark brown spots along the dorsal surface, and (2) a peppering of reddish dots all over the back and sides. This latter feature they share with *Bufo w. woodhousii* of the same age. The ventral surface is white.

The behavior of the young toads changes after some time. At first, they remain constantly at the side of the pool into which they seek to go if frightened. In about two days they begin to disperse in all directions and no longer seek to find the pool when disturbed.

They begin feeding immediately upon leaving the pool. The food consists of mites, small beetles and other insects, and young snails (Physa). Growth is very rapid: within a week, some may increase as much as 200% in weight, although others may not be nearly so large. In one summer (about four months after metamorphosis) some of them are half-grown but many have not reached more than one fourth or one third the size at adulthood. The variation in size attained indicates that the size of young individuals of this species is not always an indication of age as assumed by Dickerson (1913). It also suggests that adulthood may be reached by some individuals much before others.

BIBLIOGRAPHY

- Bragg, Arthur N., 1936. Notes on the breeding habits, eggs, and embryos of *Bufo cognatus* with a description of the tadpole. *Copeia* 1936, No. 1: 14-20.
- Bragg, Arthur N., 1937. Observations on *Bufo cognatus* with special reference to breeding habits and eggs. *Amer. Midl. Nat.* 18: 273-284.
- Bragg, Arthur N., 1937. A note on metamorphosis of the tadpoles of *Bufo cognatus* Say. *Copeia* 1937, No. 4: 227-228.
- Dickerson, Mary C., 1913. *The Frog Book*, Doubleday Page & Co., N. Y. C.
- Ruthven, Alexander G., 1907. A collection of reptiles and amphibians from southern New Mexico and Arizona. *Bull. Amer. Mus. Nat. Hist.* 23:483-604.
- Strecker, John K., 1910. Notes of the fauna of a portion of the canyon region of Northwestern Texas, *Baylor Univ. Bull.* 13:19-21.
- Tanner, Vasco M., 1931. A Synoptical study of Utah Amphibia. *Trans. Utah Acad. Sci.* 8: 159-198.