

A CHECKLIST OF THE CAVE FAUNA OF OKLAHOMA: AMPHIBIA

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The biology of Oklahoma caves is poorly known and little information is available on the vertebrate and invertebrate cave fauna. This study gives available records for amphibians with 18 species (8 Caudata and 18 Anura) reported as occurring in Oklahoma caves. Only one troglobitic amphibian is recognized, the grotto salamander, *Typhlotriton spelaeus*. Published records and a comprehensive bibliography are included.

Information on invertebrate and vertebrate faunas in Oklahoma caves is sparse. Only the single study by R. C. Harrel (1, 2) on Wild Woman Cave, Murray County, includes information on the total fauna in an Oklahoma cave. The bibliography of cave fauna prepared by Thompson (3) listed only 40 references, whereas over 100 references (not including those on Chiroptera) dealing with Oklahoma cave life actually exist (4).

Field work in recent years has facilitated the publication of this checklist of Oklahoma's amphibian cave fauna. Only one troglobitic amphibian species is recognized from Oklahoma, the grotto salamander, *Typhlotriton spelaeus*. Future publications, will cover other cavernicolous vertebrates and the invertebrates in Oklahoma caves. The purpose of this checklist is to provide a guide to the Oklahoma cave fauna.

METHODS

Extensive collections of vertebrates and invertebrates have been made in over 30 caves, while numerous other caves have been examined only briefly for their fauna. Limestone, gypsum, granite, and sandstone caves were included to obtain a broad spectrum of the Oklahoma cave fauna. A standardization of Oklahoma cave names has not yet been completed, and names used are those presently accepted by the Central Oklahoma Grotto of the National Speleological Society. Detailed locations to these caves are available from the Grotto and some are given in Glass and Ward (5).

Terminology used to indicate the probable ecological classification of species is that currently being used by cave biologists.

True cave organisms, called *troglobites*, show modifications for their underground existence. Troglobites usually are devoid of pigment, are blind, and cannot survive for any length of time in environments outside caves. *Troglophiles* are organisms that may spend their lives and complete their life cycles within caves, but do not show the extreme modifications for cave existence as do the troglobites. Troglophiles can occupy and survive in suitable niches outside caves. *Trogloxenes* are usually regarded as cave visitors even though many commonly occur in caves. Trogloxenes must spend some time outside caves in order to complete some part of their life cycles. *Accidentals* are those animals that wander, wash, or perhaps fall into caves and cannot survive for long in the cave environment.

RESULTS AND DISCUSSION

Following is an annotated list of the frogs, toads, and salamanders observed in Oklahoma caves, many of which have not been recorded previously from Oklahoma caves. Common names of amphibians follow the recommendations of the Committee on Herpetological Common Names (6). Cave names and some instances cave locations are listed after county names.

PHYLUM CHORDATA

CLASS AMPHIBIA

Order Caudata

Family Ambystomidae

Ambystoma tigrinum mavortium Baird

Barred tiger salamander
Oklahoma records. Greer County: Jester Cave. Harmon County: Reed Bat Cave. Major County: Haystack Cave; Nescatunga Cave; Sculpture-Oaktree

Cave; Vickery Bat Cave; Vickery Waterfall Cave; 1,500 Ft. Cave. Woodward County: Hathaway Cave; Horseshoe Cave; Idiot Cave; Milk-bottle Cave; J. Selman Cave System; Neighbor Cave; Owl Cave; Porcupine Cave; Section 6 Cave; Terrell Cave; Water Cave; Water Cress Cave; Washita County: Endless Cave.

Comment. Troglaxene or troglophile. Adults are common throughout the year in some gypsum caves of western Oklahoma. A population apparently completing its life cycle in Nescaunga Cave, Major Co., was reported by Black (7). The sight records of white fish reported by Hall (8) in Alabaster Caverns and other caves in western Oklahoma, probably represent larvae of the barred tiger salamander which are completely white or cream in color in gypsum cave waters.

Family Plethodontidae

Plethodon cinereus serratus Grobman

Ouachita red-backed salamander

Oklahoma records. Adair County: Sam's Pit.

Comment. Troglaxene. A collected immature specimen was crawling, from a small pool of water about 100 feet from the entrance, in total darkness.

Plethodon glutinosus glutinosus (Green)

Slimy salamander

Oklahoma records. Adair County: Charley Owl Cave; Christian School Study Cave; Duncan Field Cave System; Gallcatcher Cave; Three Forks Cave; Sam's Pit; 4 mi. N Stilwell (9); cave 5 mi. S Kansas (9); Cherokee County: Ball's Crystal Cave; Double Barrel Cave; Tahlequah Pit; 1 mi. S Scraper (9). Delaware County: Bell's Bluff Cave; Bolton Cave; Cooler Cave; Featherhead Cave; Stansberry-January Cave; Tolbert's Cave; Twin Cave. Sequoyah County: Cottonwood Cave.

Comment. Troglophile. Slimy salamanders are common in entrances and twilight zones and, occasionally, in deeper recesses of caves in eastern Oklahoma. Eggs were found twice in Sam's Pit, Adair Co., on 1 November and 8 November 1970. A female, of 73.2 mm snout-vent length, with 13

eggs was discovered in a crevice on a pile of breakdown near the cave entrance. The eggs averaged 9.9 mm in diameter. Another female with 5 eggs was found in a pocket in the wall about 200 ft from the entrance.

Typhlotriton spelaeus Stejneger

Grotto salamander

Oklahoma records. Adair County: Bat Cave 5 mi. S Kansas (10); Spring Cave ¼ mi. from Bat Cave (10); 6 mi. NNE Proctor (11); 8 mi. S Kansas (12). Cherokee County: Spring Mouth Cave 6 mi. NE Tahlequah (10); 4 mi. S Kansas near Riverton (11); south of Scraper (13). Delaware County: Anticline Cave; Bolton Cave; cave between Spavinaw and Jay (14); Cooler Cave; East Hollow Cave; Featherhead Cave; Mitchell's Cave; Russell's Roadside Cave; Stansberry-January Cave; Surprise Cave; Star Cave; Mark-Tom Cave; Tolbert's Cave; Twin Cave; Summerfield Creek Cave. Ottawa County: SE Quapaw (11); 5 mi. N Turkey Ford (11). Mayes County: brook 3 mi. NE Locust Grove (15); Grand River Dam (11); spring 5 mi. S. Locust Grove (10).

Comment. Troglobite. This is the only troglobitic amphibian presently known in Oklahoma. *Typhlotriton spelaeus* and its synonyms *Typhlotriton nereus* Bishop and *Typhlotriton braggi* Smith have all been reported from Oklahoma. Adults have been considered as rare, there being only one published record of an adult (14). Adult grotto salamanders were found in many north-eastern Oklahoma caves during this study. Over 28 adults were observed at one time in Stansberry-January Cave, with 19 of them on one guano pile. Larvae are quite common in streams and springs associated with caves. This salamander is restricted to the Ozark Plateau in Oklahoma.

Eurycea longicauda melanopleura (Cope)

Dark-sided salamander

Oklahoma records. Adair County: cave 5 mi. S Kansas (16); Charley Owl Cave; Duncan Field Cave System; Gallcatcher Cave; Three Forks Cave; Walkingstick Hollow Cave. Cherokee

County: caves 13 mi. NE Ft. Gibson (17); Dressler Cave. Delaware County: Jail Cave; Stansberry-January Cave; Summerfield Creek Cave; Tolbert's Cave; cave ½ mi. NW Upper Spavinaw Dam (18); 1 mi. SW Flint (9). Mayes County: Locust Grove (9). Ottawa County: Cave Springs Ranch Cave. Sequoyah County: Cottonwood Cave. LeFlore County: cave mouths and springs (19).

Comment. Troglophile. This salamander is not as common as *Eurycea lucifuga* in Oklahoma caves, but is found in small number in most limestone caves in eastern Oklahoma. Dark-sided salamanders usually are found under rocks in the twilight zone and only occasionally on cave walls. In Three Forks Cave, Adair Co., these salamanders have been observed in the deeper recesses over 800 ft from the nearest entrance.

Eurycea lucifuga Rafinesque

Cave salamander
Oklahoma records. Adair County: cave 5 mi. S Kansas (16); Charley Owl Cave; Christian School Study Cave; Devil's Pit Sink; Duncan Field Cave System; Gallcatcher Cave; Three Forks Cave; Shirley Spring Cave; Tunnel Cave; Walkingstick Hollow Cave; Watts (20); 5.5 mi. S Kansas (20); Stilwell (20); 6 mi. S Stilwell (20). Cherokee County: Ball's Crystal Cave; Double Barrel Cave; Dressler Cave; Single Barrel Cave; Tahlequah Pit; cave 13 mi. NE Ft. Gibson (17); Scrapper (20); 1.25 mi. S Galena (20). Delaware County: Bell's Bluff Cave; Bolton Cave; Cooler Cave; Coward's Cave; Duncan's Cave; Flat Cave; Featherhead Cave; Russell's Roadside Cave; Spavinaw Bat Cave; Tolbert's Cave; 2 mi. N Flint (20); 1.7 mi. N Flint (20); 1 mi. S Spavinaw (20). Mayes County: cave SW Jay near New Spavinaw Dam (20); Locust Grove (20); 4 mi. S Locust Grove (9). Ottawa County: Cave Springs Ranch Cave; Jack Squirrel Cave. Wagoner County: Ft. Gibson Cave No. 3.

Comment. Troglophile. The cave salamander is common in most moist limestone caves of northeastern Oklahoma, and is restricted to the lime-

stone areas of eastern Oklahoma. Hutchinson (20, 21, 22) reported that *E. lucifuga* usually lives in the twilight zone of caves, rarely in deeper cave recesses. This is true in most Oklahoma caves where numerous cave salamanders are found in cracks and on the walls in the twilight zone. In others, such as Three Forks Cave, Adair Co., adult cave salamanders are found over 1,000 ft from the entrance, in the deepest sections of the cave. Adults in Three Forks Cave were observed to drop from walls into a deep pool of water and lie motionless on the bottom.

Eurycea multiplicatus griseogaster Moore and Hughes Gray-bellied salamander
Oklahoma records. caves in the Ozarks (23).

Comment. Dundee (23) indicates that members of this species may be neotenic in caves. No definite records of its occurrence in Oklahoma caves are known.

Eurycea tymerensis Moore and Hughes
Oklahoma salamander

Oklahoma records. Adair County: Three Forks Cave.

Comment. Troglaxene. Larvae were collected from a small stream about 800 ft from the entrance. Also present in the stream were larvae of *E. l. melanopleura*.

Order Anura

Family Bufonidae

Bufo woodhousei velatus Bragg and Sanders East Texas toad

Oklahoma records. Adair County: Christian School Study Cave.

Comment. Accidental. A single East Texas toad was observed about 100 ft from the entrance of this limestone cave, in a depression in soft soil on a ledge above a small stream.

Family Hylidae

Hyla crucifer crucifer Wied

Northern spring peeper
Oklahoma records. Adair County: Charley Owl Cave; Three Forks Cave.

Comment. Accidental. Northern spring peepers were found on 1 August 1970, in small holes and crevices in the limestone walls; at least 10 frogs were counted in a 6 ft wall area of one cave.

Acris crepitans blanchardi Harper

Blanchard's cricket frog

Oklahoma records. Mayes County: cave 7 mi. SE Locust Grove (14).

Comment. Accidental. Blair (14) reported 15 cricket frogs under limestone boulders which marked the exit of a small stream from this tiny cave. I have also found this frog near entrances of gypsum caves in northwestern Oklahoma.

Pseudacris triseriata feriarum (Baird)

Upland chorus frog

Oklahoma records. Adair County: Three Forks Cave.

Comment. Accidental. A single upland chorus frog was found in a small crack in a limestone wall about 100 ft from the cave entrance.

Pseudacris clarki Baird

Spotted chorus frog

Oklahoma records. Kiowa County: Long Horn Cave.

Comment. Accidental. A single spotted chorus frog was collected at the bottom of the entrance pit in a moist area by a cave wall in the twilight zone.

Family Microhylidae

Gastrophryne olivacea olivacea (Hallowell)

Great Plains narrow-mouthed toad

Oklahoma records. Major County: Nescatunga Cave.
 Comment. Accidental. Observed in area of total darkness several hundred feet from the entrance.

Family Ranidae

Rana catesbeiana Shaw

Bullfrog

Oklahoma records. Greer County: Jester Cave.
 Comment. Accidental. An adult moved down a passage into total darkness from the twilight zone.

Rana clamitans melamota (Rafinesque)

Green frog

Oklahoma records. Delaware County: Stansberry-January Cave.

Comment. Accidental. Juvenile green frogs are common along the stream inside the twilight zone of this limestone cave.

Rana palustris palustris LeConte

Pickerel frog

Oklahoma records. Delaware County:

cave ½ mi. NW Upper Spavinaw Dam (18); Jail Cave; Twin Cave.

Comment. Troglaxene. The only frog that is consistently found in caves, usually near the twilight zone.

Rana pipiens Schreber

Leopard frog

Oklahoma records. Adair County: Christian School Study Cave; Three Forks Cave. Delaware County: Bolton Cave; Stansberry-January Cave. Greer County: Jester Cave. Kiowa County: Long Horn Cave. Washita County: Washita Bat Cave. Woodward County: J. Selman Cave System. Major County: Nescatunga Cave. Mayes County: cave 7 mi. SE Locust Grove (24).

Comment. Troglaxene. Members of this species are common in Oklahoma caves, especially those with streams or pools of water. Blair (14) reported 20 leopard frogs under limestone boulders which marked the exit of a small stream from a tiny cave in Mayes Co. He suggested that it was a good overwintering site. I found that the digestive tracts of several leopard frogs, collected from areas of total darkness in northwestern Oklahoma gypsum caves, contained the remains of flies (Family Heleomyzidae), beetles (Family Carabidae and Family Catopidae), and crickets (Family Gryllacrididae). These invertebrates and leopard frogs were common near guano piles.

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