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Cave Fauna of Arkansas: Further Records

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CAVE FAUNA OF ARKANSAS: FURTHER RECORDS

This report represents the fourth in a series of reports describing the fauna of Arkansas caves. The first paper included records of selected invertebrate taxa (McDaniel and Smith, 1976); the second included a summary of vertebrate records (McDaniel and Gardner, 1977); and the third included additional records of both invertebrate and vertebrate taxa (McDaniel et al., 1979). In this paper we update previous records with respect to collections and/or identifications made during the past three years.

The number of troglobites (obligate cavernicoles) known to inhabit any one cave continues to increase, as does the distribution of cavernicolous taxa reported from Arkansas.

Methodology was as reported earlier (McDaniel and Smith, 1976) in which collection of specimens was minimal and usually for the purpose of identification only. All forms collected by the authors are represented by voucher specimens in the collections at Arkansas State University, or in the taxonomic collections of other recognized researchers.

We have included notable records of extinct faunal elements reported by Hawksley et al. (1980), Youngsteadt and Youngsteadt (1980) and a recent record of *Typhlichthys subterraneus* by Paige et al. (1981) in an effort to collate information on Arkansas cavernicoles.

For newly reported taxa, we have again included probable ecological position in the cave environment, and we continue to utilize the terms troglobite, troglophile, trogloxene, and accidental (Barr, 1963).

Records of taxa not previously reported from Arkansas caves comprise the following list; new records for previously reported taxa are found in the table.

PHYLUM ARTHROPODA
Class Insecta
Order Megaloptera
Family Corydalidae
Chauliodes sp. Accidental; Izard Co.; Clay Cave.
Order Diptera
Family Calliphoridae
undetermined sp. Accidental; Stone Co.; Wind Tunnel Cave.
Family Streblidae
undetermined sp. Trogloxene; Marion Co.; Blue Heaven Cave.
A large population occurs on *Plecotus townsendii ingens* and occasionally on co-inhabiting *Myotis grisescens*.
PHYLUM CHORDATA
Class Mammalia
Order Carnivora
Family Ursidae
Ursus americanus Trogloxene; Stone Co.; Wind Tunnel Cave.
Skeletal remains of a juvenile black bear were located far into the cave suggesting a former entrance. Searcy Co.; Hurricane River Cave. Youngsteadt and Youngsteadt (1980) reported signs and remains of black bear.
Family Felidae
Smilodon floridanus Trogloxene; Searcy Co.; Hurricane River Cave.
This extinct species was reported by Hawksley et al. (1980).

Assistance in identification of specimens is gratefully acknowledged from T. C. Barr, carabids; N. B. Causey, millipedes; J. R. Holsinger, amphipods; L. Knutson, insects; J. Lewis and T. Bowman, isopods; and G. Steyskal, heleomyzids.

TABLE

TAXON	NEW RECORD(S)	TAXON	NEW RECORDS
Bactrurus mucronatus	Randolph Co.: Mansell C.	*Typhlotriton spelaeus*	Fulton Co.: Richardson C.: Stone Co.: Wind Tunnel C.
Caecidotea antricola	Baxter Co.: Roper C.	*Rana palustris*	Baxter Co.: Grahum C.
Scoterpes sp.	Searcy Co.: Davis Pit: Stone Co.: Roland C.	*Storeria occipitomaculata*	Baxter Co.: Grahum C.: Stone Co.: Hell Creek C.
Auturus evides	Fulton Co.: Richardson C.	*Virginia valerie elegans*	Baxter Co.: Grahum C.: Stone Co.: Hell Creek C.
Pseudopolydesmus pinetorum	Fulton Co.: Richardson C.: Searcy Co.: Davis Pit	*Agkistrodon contortrix contortrix*	Baxter Co.: Grahum C.
Ptomaphagus cavernicola	Stone Co.: Bald Scrabby C.	*Myotis grisescens*	Stone Co.: Wind Tunnel C.
Sinella barri	Randolph Co.: Mansell C.	*Pipistrellus subflavus*	Baxter Co. Grahum C.: Stone Co.: Wind Tunnel C.
Staphilinidae: undetermined sp.	Izard Co.: Clay C.: Baxter Co.: Roper C.: Fulton Co.: Richardson C.	*Neotoma floridana*	Fulton Co.: Richardson C. Stone Co.: Wind Tunnel C.
Amoebalaria defessa	Stone Co.: Wind Tunnel C.	*Peromyscus attwateri*	Stone Co.: Wind Tunnel C.
Exechia	Fulton Co.: Richard C.	*Microtus pinetorum*	Baxter Co.: Grahum C.: Stone Co.: Wind Tunnel C.
Neuratelia sp.	Izard Co.: Clay C.	*Felis rufus*	Fulton Co.: Richardson C.
Phoridae: undetermined sp.	Fulton Co.: Richardson C.	*Mephitis mephitis*	Fulton Co.: Richardson C.
Tipulidae: undetermined sp.	Izard Co.: Clay C.	*Procyon lotor*	Independence Co.: unnamed C.
Typhlichthys subterraneus	Fulton Co.: Richardson C.		
Eurycea longicauda melanoplura	Stone Co.: Hell Creek C.		
Eurycea lucifuga	Izard Co.: unnamed C.		

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AQUATIC MACROINVERTEBRATE TAXA PRESENT IN TWO OZARK SPRINGS IN RANDOLPH COUNTY, ARKANSAS

Previous studies concerning the aquatic macroinvertebrates found in the Ozark Plateau of Arkansas have dealt only with stream populations (Sublette, 1956; Van Kirk, 1962; Aggus and Warren, 1965; Robison and Harp, 1971; McGary and Harp, 1972; Cather and Harp, 1975). None have involved aquatic macroinvertebrate communities in cold water springs. The Salem Plateau section of the Ozark Plateau province supplies many cold water springs of varying size. This is largely due to the abundance of limestone and dolomite, which provides a good geologic base for the development of springs (Croneis, 1930; Thornbury, 1965). Spring basins provide a slightly different habitat for aquatic macroinvertebrate communities. Temperatures and water levels generally are confined to a more narrow range than in a stream and experience minimal seasonal variations with regard to several other physiochemical parameters (Clifford, 1966). However, temperatures are not so limiting as in cold water discharges from main stem reservoirs (McGary and Harp, 1972).

The springs that were sampled were designated Spring I and Spring II. Spring I is located in S7, T20N, R1E in Randolph County, Arkansas, and is considered to be a permanent spring. It is at an elevation of 110 m and has an average volume flow of 65.5 cc/sec that flows in a southward direction. This spring is surrounded by grassy pastureland which has not had any domestic grazing for more than eight years. The spring is shaded by one sycamore tree *(Plantanus occidentalis)* with one eastern red cedar *(Juniperus virginiana)* located about 15 m to the west. A small, spring-fed pond occurs about 100 m to the west. The spring basin was dredged over a year ago and its greatest depth is 1 m. The north end has an almost vertical drop, and this deep end covers approximately 25 percent of the basin's surface area. The rest of the basin ranges in depth from 0.08 to 0.23 m. The basin has a mean width of 2.13 m.

Spring II is located in S27, T20N, R2W, Randolph Co., Arkansas. It is a smaller spring in terms of volume flow and basin size. The volume flow ceased temporarily during the driest part of the 1980 summer drought, but the spring was still able to maintain most of its basin size. This spring lies at an elevation of 140 m and has an average volume flow of 57.8 cc/sec. Spring II is not nearly as open as Spring I, but rather is surrounded by an oak-hickory forest with thick undergrowth which provides shade throughout the entire day. It has been free of domestic animals for more than eight years and is about 200 m from a small creek. This spring varies in depth from 0.08 to 0.18 m. Its basin has a mean width of 1.22 m.

Data were collected biweekly from each spring from 26 April through 13 June 1981. Ambient and water temperatures were taken using a standard Celsius thermometer. Water was tested for pH, nitrate (NO_3), carbon dioxide, ammonium nitrogen and phosphate (PO_4) using Hach water test kits 17-N, NI-11, CA-23, NI-8 and PO-19/PO-19A, respectively. Spatial measurements were made by using a standard yardstick an converting values to metric units. Spring volume flow was measured at the outflow from the basin by a modification of the mean-sectional metho (Butler, 1957). The first and third macroinvertebrate samples were collected by use of a fine mesh aquatic dip net. The second and fourth macroinvertebrate samples were obtained by use of a 12 volt-DC BioQuip blacklight collecting light. Two adult odonates were obtained using an aerial net. Samples were preserved in 70 percent ethanol. Aquatic organisms were identified according to Pennak (1978), with the exception of Gerridae which were identified according to Kittle (1980). All samples were quantified by standardizing the length of the sampling period, specifically one hour.

To minimize the effects of extrinsic factors, springs were sampled under similar logistic conditions. Water quality was quite similar for both springs, and little fluctuation occurred in the physicochemical parameters measured during the study period (Table 1). This is typical of springs (Clifford, 1966), and is derived from the ground waters flowing through similar geologic formations. Carbon dioxide, ammonium nitrate and phosphate were never present in detectable concentrations in either spring. A total of 225 organisms representing 13 taxa was collected from Spring I, while only 80 organisms of 8 taxa were collected from Spring II (Table 2). The reduced taxonomic diversity resulted primarily from the limiting factor of a rather low constant water temperature. Numerical standing crop was moderate, considering the small basin size of these two springs. The lower numerical standing crop and reduced diversity in Spring II were probably derived from its less constant discharge (which ceased during the height of the 1980 drought). Further, this spring is shaded throughout the day, thus reducing photosynthesis and therefore autochthonous food materials. The smaller size of this basin may also have been a contributing factor. *Crangonyx* was the most abundant organism in both springs, constituting 67 and 51 percent of the organisms in Springs I and II, respectively. *Isoperla* was the second most abundant organism in Spring I (11%), while *Gerris* was second most abundant in Spring II (29%). *Crangonyx* is an omnivorous, general scavenger. *Gerris* usually eat a variety of crustaceans and aquatic insects that they catch just below the water surface, but alternatively may consume terrestrial insects that fall into the water. *Isoperla* is polyphagous, but is primarily predatory on other aquatic insects (Pennak, 1978). The dominance of these organisms implies that primary production and other autochthonous food sources were minimal in these two springs.