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Cave Fauna of Arkansas: Selected Invertebrate Taxa

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ABSTRACT

This report is the first in a series of reports describing the fauna of Arkansas caves. Included are notes accumulated during the past four years on nematomorphs, amphipods, isopods, diplopods, decapods, and a variety of insect taxa. In addition to indicated records of distribution, the ecological status of each species (as a cavernicole) is described as troglolitic, troglophilic, troglonexic, or accidental. Several of the included species are reported for the first time from Arkansas.

INTRODUCTION

The Ozark region of Arkansas contains hundreds and possibly even thousands of limestone caves, almost all of which harbor various forms of life. Although large numbers of both invertebrate and vertebrate organisms have been encountered in these caves, relatively few scientific efforts have been made to document or in any way study the cavernicolous fauna of Arkansas. The most readily available studies extensively covering aspects of the fauna associated with Arkansas caves include a small series of papers on cave-dwelling salamanders (Bishop 1944; Smith 1960, 1964, 1968; Brandon 1962, 1966; Brandon and Black 1970), some inspecific comments on the fauna of all Ozark caves (Hubricht 1950), a paper on records of bats in Arkansas (Sealander and Young 1955), a description of a new cave beetle (Sanderson and Miller 1941), a description of a new troglolitic crayfish (Hobbs and Bedinger 1964), the Environmental Impact Statement for Blanchard Springs Caverns (U.S. Forest Service 1973), and a thesis listing only major invertebrate groups and vertebrate species present in Blanchard Springs Caverns (Grove 1974). In addition, various species have been mentioned as present in Arkansas (Nicholas 1960; Holsinger 1967, 1972; Fleming 1972), but there is no comprehensive list of species in Arkansas caves. This report is the first in a series of reports documenting the presence and distribution of organisms inhabiting the caves of Arkansas. The list is not complete for the groups covered, but is intended to provide an initial basis upon which other investigations can be instituted.

METHODS

During the past four years, the caves of northcentral Arkansas have been searched extensively for forms of life. Collection has been minimal and has been for the purpose of identification only. All forms collected by the writers are represented by voucher specimens in the Collection of Cavernicolous Materials at Arkansas State University or in the collections of other recognized taxonomists. Species and localities reported herein are the results of the writers' collection efforts unless otherwise indicated.

Included for each species in this list are the probable ecological position of the species in the cave environment, all Arkansas cave records assembled by the writers to date, and a comment concerning the status, collection, or life history of the species. The convention of contemporary biospeleologists is followed in the use of the terms "troglolite," "troglophile," "troglonexic," and "accidental" to describe the probable ecological position of animals found in the cave environment (Barr 1963). Although widely used, these terms are relevant only to an organism in the cave environment. Troglolites are obligate cavernicoles unable to exist in epigeal environments, and normally show marked adaptation to the cave environment (e.g., absence of pigments and eyes, and hypertrophy of other sensory modalities). Troglophiles commonly are found in caves, but exist equally well in suitable epigeal environments. Troglonexics may be common in caves, but must periodically leave the cave for completion of their life cycles (e.g., bats and cave crickets). Accidentals normally do not live in caves, but have fallen, washed, or wandered into a cave. Accidentals are unable to survive long in the cave environment.

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ANNOTATED LIST OF ARKANSAS CAVE FAUNA

PHYLUM ASCHELMINTHES

Class Nematomorpha
Order Gordioidea

Undetermined species, troglonexic. Izard Co.: Clay Cave; Stone Co.: Ennis Cave. Adults were taken from shallow stream pools in the twilight zone of these caves. Larval gordian worms are internal parasites of many insects, including the abundant cave crickets, *Ceuthophilus* sp.

PHYLUM ARTHROPODA

Class Crustacea
Order Amphipoda
Family Gammaridae

Batrachus mucronatus (Forbes), troglophile. Northcentral Arkansas. According to Holsinger (1972) this is a common interstitial species.

Crangonyx forbesi (Hubricht and Mackin), troglophile. Ozark region of Arkansas. Hubricht (1950) reports this species is found in caves throughout the Ozarks. Holsinger (1972) indicates this may actually be an undescribed species closely related to *C. forbesi*.

Crangonyx obliquus (Hubricht and Mackin), troglophile. Johnson Co. In Arkansas, this species has been found only in springs, but Nicholas (1960) considers it a cave inhabitant of the Eastern United States.

Gammarus minus Say, troglonexic. Izard Co.: Needles Cave. Found throughout Needles Cave, these epigeal amphipods are

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extremely abundant in the stream flowing from the mouth of this cave.

Gammarus pseudolimnaeus Bousfield, troglone. Specific locality in Arkansas unknown. Although it is not definitely recorded from Arkansas caves, Nicholas (1960) considered this species a cave inhabitant.

Stygonectes alabamensis alabamensis (Stout), troglone. Benton Co.: seep; Boone Co.: seep; Izard Co.: Bergren Cave, Clay Cave, Needles Cave; Jackson Co.: spring; Logan Co.: seep; Newton Co.: seep; Searcy Co.: seep; Stone Co.: Allison Cave, Blanchard Springs Caverns. This species is common in Arkansas (Holsinger 1967), and usually is found in drip pools; however, two specimens were taken from the stream in Needles Cave.

Stygonectes elatus Holsinger, troglone. Logan Co.: seep. To date, recorded only from a seep near Magazine Mtn. (Holsinger 1967, 1972).

Stygonectes montanus Holsinger, troglone. Polk Co.: spring. Known only from a spring near Rich Mtn. (Holsinger 1967, 1972).

Stygonectes ozarkensis Holsinger, troglone. Benton Co.: Cave Springs Cave, Danford Cave. Specimens have been found in streams far from the entrances of these caves (Holsinger 1967).

Order Isopoda
Family Asellidae

Asellus ancylus Fleming, troglone. Boone Co.: Brewer Cave. Fleming (1972) reported this species from the mud of a stream floor.

Asellus antricolus (Creaser), troglone. Independence Co.: Cushman Cave, Dodd Cave; Izard Co.: Needles Cave; Searcy Co.: Hurrican Cave; Stone Co.: Rowland Cave. Aspects of the life history of this apparently abundant organism are being studied by K.L. Smith. *Asellus nickajackensis* is a synonym of *A. antricolus* (Steeves 1966).

Asellus brevicauda Forbes, troglone. Specific locality in Arkansas unknown. Nicholas (1960) reported this species from Arkansas, but gave no locations.

Asellus dimorphus (Mackin and Hubricht), troglone. Searcy Co.: Jackson Co. Little is known of this species (Fleming 1972; Mackin and Hubricht 1940).

Asellus oculata (Mackin and Hubricht), troglone. Polk Co.: Rich Mtn. This species has been collected from several springs and may be present in caves.

Asellus stiladactylus (Mackin and Hubricht), troglone. Benton Co.: Big Spring at Bella Vista, Cave Spring Cave. This species was reported by Fleming (1972), but little is known of its life history.

Asellus tridendatus (Hungerford), troglone. Lawrence Co. This species was taken from a deep cistern near Imboden (Fleming 1972).

Lirceus n. sp., troglone. Independence Co.: Foshee Cave; Stone Co.: Hell Creek Cave. This unpigmented and minutely eyed isopod is very different from the only other cave species of this genus, *L. usdagalun* (T.E. Bowman, pers. comm.). Specimens have been taken from the bottom of rocks in the riffles of these caves. The writers found these isopods to be abundant in these two caves.

Family Trichoniscidae

Miktoniscus sp., troglone. Izard Co.: Clay Cave. The poorly known oniscoids are relics of a once widely distributed group (Vandel 1964). A single specimen was taken about 1000 ft from the entrance on a sand bank littered with stream debris.

Family Ligiidae

Ligidium elrodii elrodii (Packard), troglone. Stone Co.: Blanchard Springs Caverns. One of the few native terrestrial isopods of North America. Prefers moist conditions, but generally avoids areas subject to flooding (Hatchett 1947). *Ligidium longicaudatum* Stroller is a junior synonym of this species (Schultz 1970).

Order Decapoda

Family Astacidae

Cambarus zophonastes Hobbs and Bedinger, troglone. Stone Co.: Hell Creek Cave. This recently described crayfish is known only from the type locality (Hobbs and Bedinger 1964).

Orconectes sp., troglone. Independence Co.: Cushman Cave; Izard Co.: Needles Cave. A common epigean form that often enters the twilight zone of caves.

Class Diplopoda

Order Cambalida

Family Cambalidae

Cambala (minor) Bollman, troglone. Stone Co.: Roasting Ear Cave. The writers' single specimen was in the post-molt stage, making specific identification difficult. This species is frequently found in caves.

Order Chordeumida

Family Conotylidae

Scoterpes dendropus Loomis, troglone. Carroll Co.; Newton Co. According to Causey (pers. comm.), this is one of two species present in caves along the White River.

Scoterpes n. sp., troglone. Independence Co.: Cushman Cave, Dodd Cave; Izard Co.: Bergren Cave, Clay Cave, Donovan Cave, Needles Cave; Stone Co.: Blanchard Springs Caverns, Hell Creek Cave. In northcentral Arkansas this appears to be the most abundant troglone millipede. This species is very similar to *S. martini* and is being described by Causey.

Trichopetalum unicum Cook and Collins, troglone. Sharp Co.: Center Cave. A troglone with well developed ocelli.

Family Cleidogonidae

Pseudotremia pinetorum, undetermined. Stone Co.: Blanchard Springs Caverns. The writers are unfamiliar with this species, but it was listed in the Environmental Impact Statement for Blanchard Springs Caverns and therefore is included in this list.

Order Platydesmida

Family Androgonthidae

Brachycybe lecontei Wood, troglone. Sharp Co.: Center Cave #2. One specimen was taken from the twilight zone.

Order Polydesmida

Family Euryuridae

Auturus evides (Bollman), troglone. Independence Co.: Cushman Cave, Dodd Cave; Izard Co.: Clay Cave; Stone Co.: Roasting Ear Cave. This common epigean form often is found in large numbers associated with bat guano deposits.

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Family Polydesmidae

Antriadesmus sp. Loomis, troglobite. Independence Co.: Cushman Cave; Izard Co.: Clay Cave. This small millipede usually is associated with *Scoterpes*. These records are the first for Arkansas.

Pseudopolydesmus pinetorum (Bollman), troglophile. Izard Co.: Clay Cave; Sharp Co.: Center Cave, Center Cave #2. Although normally an epigean species, this millipede is present in the twilight zone of caves.

Order Spirobolida

Family Spirobolidae

Narceus americanus (BeauVois), accidental. Independence Co.: Cushman Cave. This large epigean millipede was found in the twilight zone of this cave, where it apparently had strayed.

Class Insecta

Order Collembola

Family Entomobryidae

Pseudosinella argenta Folsom, troglophile. Independence Co.: Dodd Cave; Izard Co.: Clay Cave; Stone Co.: Allison Cave. Specimens were taken from the surface of water far from the entrances of these caves.

Pseudosinella dubia Christiansen, troglobite. Washington Co.: Devils Den Cave, Devils Den Kitchen Cave, Granny Dean Cave. Not collected by the writers, but reported by Christiansen (1960).

Sinella barri Christiansen, troglobite. Izard Co.: Needles Cave. Taken off the surface of standing water.

Family Isotomidae

Folsomia candida Willem, troglophile. Izard Co.: Needles Cave. Taken off the surface of standing water.

Family Poduridae

Neanura barberi Handschin, troglophile. Izard Co.: Clay Cave. Taken off a sand bank beside standing water.

Family Sminthuridae

Arrhopalites clarus, troglaxene. Newton Co.: Boxley Cave. Taken in the twilight zone.

Arrhopalites pygmaeus (Wankel), troglaxene. Izard Co.: Clay Cave. Taken from flood debris near a small stream.

Ptenothrix sp. Börner, accidental. Izard Co.: Clay Cave. Not a cave form, probably wandered in. Young specimen.

Order Ephemeroptera

Family Heptageniidae

Stenonema tripunctatum (Banks), accidental. Izard Co.: Needles Cave. A nymph was taken from the underside of a stream stone in the twilight zone.

Order Hemiptera

Family Coreidae

Undetermined species, accidental (?). Stone Co.: Roasting Ear Cave. A single nymph was taken from a wet wall about 400 ft from the entrance.

Family Gerridae

Gerris remigis Say, troglaxene. Izard Co.: Needles Cave. This species was taken from the pool area of a stream flowing from the entrance. Taken from the twilight zone.

Order Coleoptera

Family Carabidae

Atronus pubescens Dejean, troglaxene. Stone Co.: Blanchard Springs Caverns. Listed on the Environmental Impact Statement.

Bembidion sp. Latreille, troglaxene. Izard Co.: Needles Cave; Sharp Co.: Center Cave #2. Taken from the twilight zone.

Evarthrus sp. LeConte, accidental. Stone Co.: Hell Creek Cave. Taken at the bottom of a vertical mine shaft into this cave.

Platynus sp. Stephens, troglaxene. Stone Co.: Roasting Ear Cave. Taken from the twilight zone.

Rhadine ozarkensis Sanderson and Miller, troglobite. Washington Co.: Fincher's Cave. Not collected by the writers, but reported by Sanderson and Miller (1941). This is the only known location in the state.

Family Chrysomelidae

Paria juniperi Blatchley, accidental. Izard Co.: Needles Cave. Taken from the twilight zone.

Family Hydrophilidae

Tropisternus mexicanus mexicanus LaPorte, accidental (?). Izard Co.: Needles Cave. Taken from a stream pool in the twilight zone.

Family Leptodiridae

Ptomaphagus cavernicola (Schwarz), troglophile. Stone Co.: Blanchard Springs Caverns. Not collected by the writers but listed in the Environmental Impact Statement.

Family Staphylinidae

Psephidonus sp. Gistel, troglaxene. Stone Co.: Blanchard Springs Caverns. Not collected by the writers, but listed in the Environmental Impact Statement.

Order Trichoptera

Family Hydroptilidae

Ochrotrichia spinosa (Ross), troglaxene. Izard Co.: Needles Cave. Great numbers of pupae were found attached to riffle substrate in the stream flowing from the entrance of this cave.

Order Diptera

Family Ceratopogonidae

Dasyhelea sp. Kieffer, troglaxene. Independence Co.: Dodd Cave. Taken from the twilight zone.

Family Dixidae

Dixa sp. Meigen, troglaxene. Izard Co.: Needles Cave. Large numbers of larvae were found attached to the riffle substrate in the stream flowing from the entrance.

Family Helomyzidae

Amoebalaria sackeni Garrett, troglophile. Stone Co.: Blanchard Springs Caverns. Not collected by the writers, but listed in the Environmental Impact Statement.

Scoliocentra sp. Loew, troglophile. Independence Co.: Cushman Cave. Taken from the twilight zone.

Family Mycetophilidae

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Exechia sp. Winnertz, troglaxene. Izard Co.: Clay Cave. Taken from the twilight zone.

Exechiopsis sp., troglaxene. Sharp Co.: Center Cave. Taken from the twilight zone.

Neuratelina sp. Rondani, troglaxene. Izard Co.: Needles Cave. Taken near an opening to the surface.

Family Phoridae

Megaselia cavernicola (Brues), troglaxene. Independence Co.: Dodd Cave. This species should be common in Arkansas caves.

Family Sciaridae

Bradysia sp. Winnertz, troglaxene. Independence Co.: Dodd Cave; Izard Co.: Clay Cave. Appears to be locally common.

Family Tipulidae

Limonia stulta (Ostensacken), troglaxene. Sharp Co.: Center Cave. Taken from the twilight zone.

Tipula algonquin Alexander, troglaxene. Stone Co.: Roasting Ear Cave. Taken from the twilight zone.

Order Hymenoptera

Family Formicidae

Camponotus sayi Emery, accidental. Stone Co.: Allison Cave. Several specimens were taken from a limb floating in a pool about 500 ft into the cave. They had either washed or had been carried into the cave.

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