

The Aquatic Fauna of Russells Chapel Spring, Calloway County, Kentucky

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ABSTRACT

A survey of the aquatic fauna of Russells Chapel Spring in Calloway County, Kentucky, yielded the following kinds of organisms: 4 protozoans, 22 macroinvertebrates, 6 fishes, 2 amphibians, and 1 reptile. The collection includes a specimen of the rare aquatic earthworm *Haplotaxis gordioides*.

INTRODUCTION

Little information is available in the literature concerning the ecology of temperate springs in Kentucky. The most extensive work reported is a series of studies on the spring stream of Doe Run in Meade County in north-central Kentucky by Cole and Minckley (1961), Krumholz (1967), Minckley (1961, 1963), Minckley and Cole (1963), Minckley and Tindall (1963), Prins (1964, 1968), Walker (1961), and others. Minshall (1967, 1968) made a detailed study of Morgan's Creek, Meade County, Kentucky. A statewide ecological survey of Kentucky's temperate springs is needed as each spring is a unique microhabitat. Because of the uniform conditions often encountered, many species may be present in springs far outside their normal geographical range or a spring may harbor relict species, phreatics, or crenobionts (Hynes 1976). This paper reports a survey of the aquatic fauna of a temperate spring, Russells Chapel Spring, in Calloway County, Kentucky.

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DESCRIPTION OF STUDY SITE

Russells Chapel Spring rises in Calloway County, Kentucky, near a dirt road 100 m south of Russells Chapel, 36° 40' N and 88° 07' W. The boil is 3 m across with a maximum depth of 1 m. The water bubbles up from a central basin composed of unstable sand surrounded by clay sediment, and gives rise to a small stream choked with vegetation that empties into Little Sugar Creek approximately 30 m from the spring. Little Sugar Creek empties into the Blood River Embayment on the western side of Kentucky Lake (Tennessee River).

The surrounding area is low lying and composed of soils of the Bodine cherty silt loam and Iuka silt loam types (Humphrey et al. 1973). The area is poorly drained with numerous stagnant pools spaced throughout. Tulip poplar *Liriodendron tulipifera* trees dominate the surrounding rich woods.

Geologically, Calloway County is a part of the northern extension of the eastern Gulf Coastal Plain and contains the most recent geologic formation in Kentucky. During the Cretaceous, Tertiary, and Quaternary periods, Mississippian deposits were covered with gravel, sand, silt, and clay. The formations have not yet consolidated into sandstone or shale (Humphrey et al. 1973).

MATERIALS AND METHODS

Since Russells Chapel Spring represents a microhabitat in a state of delicate bal-

ance, it was decided to limit collections to a single period on 22–24 June 1976. On 23 June, an Ekman dredge, 150 × 150-mm opening, was used to sample 2 sites for benthic macroinvertebrates, the boil proper and midway along the stream, approximately 10 m from the boil. In the boil proper, 5 bottom samples were taken (1 from the unstable sand center and 4 from the perimeter) while a single sample was taken from the stream. Each sample consisted of 3 grabs with the Ekman dredge. On the night of 23 June, a drift net was placed in the stream and left for 12 hours. On 24 June, samples of fishes, amphibians, and invertebrates inhabiting stands of vegetation were collected using an electric shocker and dip nets of various meshes. Representative specimens of the fishes, amphibians, and reptiles were fixed in 5 percent formalin and preserved in 40 percent isopropyl alcohol, and all macroinvertebrates were fixed and preserved in 40 percent isopropyl alcohol. Two 500-ml water samples were taken and examined for Protozoa.

Organisms were identified upon return to the laboratory at Murray State University. In addition, macroinvertebrates were counted, and an index of diversity computed at the generic level using the machine formula of Weber (1973). Since this was basically a qualitative study, temperature was the only physical parameter measured.

RESULTS AND DISCUSSION

This survey resulted in the collection of 4 species of Protozoa, 22 species of macroinvertebrates, 6 species of fishes, 2 species of amphibians, and 1 species of reptile. In the following listing, the scientific name is followed where applicable by the common name, collection site, and notes on the distribution and abundance of each species. Species were ranked arbitrarily as rare when fewer than 10 organisms were collected, as common when 10–100 organisms were collected, and as abundant when more than 100 specimens were taken. The nomenclature and arrangement of taxa are

those of Pennak (1953), Eddy and Hodson (1961), Bailey et al. (1970), and Kudo (1971).

THE FAUNA

Protozoans

CHLOROMONADIDA

Chlamydomonadidae

Chlamydomonas globosa. Boil.

EUGLENOIDIDA

Euglenidae

Trachelomonas volvacina. Boil.

T. hispida. Boil.

TESTACIDA

Diffflugidae

Diffflugia globosa. Boil.

Macroinvertebrates

OPISTHOPORA

Lumbriculidae

Lumbriculus inconstans, aquatic earthworm. Stream. Rare.

Rhynchelmis sp. Boil and stream. Common.

Haplotaxidae

Haplotaxis gordioides. Stream. Rare.

ISOPODA

Asellidae

Lirceus fontinalis, aquatic sowbug. Boil and stream. Common.

Asellus stygius, aquatic sowbug. Boil. Rare.

AMPHIPODA

Gammaridae

Crangonyx sp., scud. Boil and stream. Abundant.

DECAPODA

Astacidae

Subfamily Cambarinae (immature specimens prevented further classification), crayfish. Boil and stream. Rare.

EPHEMEROPTERA

Baetidae

Caenis sp., mayfly. Boil. Rare.

ODONATA

Agrionidae

Agrion sp., damselfly. Boil. Rare.

HEMIPTERA

Hydrometridae

Hydrometra sp., marsh treader. Boil. Rare.

Gerridae

Gerris sp., water strider. Boil. Common.

Veliidae

Velia sp., broad-shouldered water strider. Boil. Rare.

Notonectidae

Notonecta sp., back swimmer. Boil. Common.

Corixidae

Genus unidentifiable as specimens were female, water boatman. Boil. Common.

MEGALOPTERA

Sialidae

Sialis sp., alderfly. Boil and stream. Common.

Corydalidae

Chauliodes sp., dobsonfly. Stream. Rare.

TRICHOPTERA

Molannidae

Molanna sp., caddisfly. Stream. Rare.

COLEOPTERA

Haliplidae

Peltodytes sp., crawling water beetle. Boil. Rare.

Helodidae

Elodes sp. Stream. Rare.

DIPTERA

Tipulidae

Tipula sp., crane fly. Stream. Rare.
Limnophila sp., crane fly. Stream. Rare.

Chironomidae

Pentaneura sp., midge. Stream. Rare.
Tendipes sp., midge. Boil and stream. Abundant.

Ceratopogonidae

Palpomyia sp., biting midge. Boil and stream. Common.

Tabanidae

Chrysops sp. Boil. Rare.

Fishes

PETROMYZONTIFORMES

Petromyzontidae

Genus unidentified (larval specimens), lamprey. Boil and stream. Common.

CYPRINIFORMES

Cyprinidae

Campostoma anomalum, stoneroller. Boil. Common.

Chrosomus erythrogaster, southern red-belly dace. Boil. Rare.

Semolitus atromaculatus, creek chub. Boil. Common.

Catostomidae

Erimyzon oblongus, creek chubsucker. Boil. Common.

PERCIFORMES

Percidae

Etheostoma caeruleum, rainbow darter. Boil. Common.

E. squamiceps, spottail darter. Boil. Common.

Amphibians

SALAMANDROIDEA

Plethodontidae

Desmognathus fuscus, dusky salamander. Boil. Common.

ANURA

Ranidae

Rana pipiens, leopard frog. Boil. Common.

Reptiles

Testudinidae

Chrysemys scripta elegans, red-eared turtle. Boil. Rare.

A generic diversity of 2.24 was calculated for the benthic macroinvertebrates from the stream while the boil itself exhibited a diversity of 2.27. These values indicate a relatively undisturbed environment having large numbers of genera with no individual genus present in overwhelming abundance (Weber 1973).

Mature specimens of *Haplotaxis gordioides* have never been identified for certain from North America but immature worms resembling it have been found in a few locations (Brinkhurst and Jamieson 1971). The exact identity of all these immature individuals must remain in doubt until the variation pattern of the dorsal setae of mature *H. gordioides* is documented (Cook 1975). The specimen collected, although immature, was identified as *Haplotaxis* on the basis of the large prostomium with a

transverse groove and the unusual sickle-shaped setae in the ventral bundles and the identification was later verified by Dr. R. O. Brinkhurst. The single specimen collected at Russells Chapel Spring probably is indicative of an association between the spring and subterranean waters since *Haplotaxis gordioides* has been found associated with subterranean waters in England, most of continental Europe, Japan, and rarely in North America (Cook 1975).

Asellus stygius is a blind isopod that inhabits subterranean springs, wells, and caves in Missouri, Indiana, and Kentucky and is rarely encountered in surface waters (Pennak 1953). However, Minckley (1961) reported it from several spring streams in north-central Kentucky.

The 2 most abundant macroinvertebrates encountered were amphipods and chironomids. The genus *Crangonyx* is widely distributed and common in unpolluted clear waters including springs, spring brooks, streams, pools, ponds, and lakes (Pennak 1953). Chironomids are considered cosmopolitan.

The collection of the southern redbelly dace, *Chrosomus erythrogaster*, represented the first collection of this species in the Coastal Plain region of western Kentucky (Freeze and Rayburn 1977).

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