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Mollusca of the Illinois River, Arkansas

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ABSTRACT

The Illinois River is in the Ozark region of northwestern Arkansas and eastern Oklahoma. A survey of the Illinois River in Arkansas produced nine species and one morphological subspecies of gastropods, three species of sphaeriid clams, and 23 species of unionid mussels. Museum records resulted in another two species and an ecophenotype of the Unionidae. This represents the first published survey of molluscan species from the Illinois River in Arkansas.

INTRODUCTION

The Illinois River is a southwestern Ozark stream. The Oklahoma portion is a component of the Oklahoma and National Scenic Rivers Systems. The Arkansas portion is presently under consideration for inclusion in the National Scenic Rivers System. The Northwest Arkansas Regional Water Quality Management Plan (Mitchell, 1974) has recommended addition of secondarily treated effluent into the Illinois. It has been noted that this may alter its environmental quality and biological composition (Kittle et al., 1974; Geisler et al., 1975). Mollusks were collected by Kittle et al. (1974) but were not identified to species. Sublette (1956), Elick (1965), Kraemer (1970), and McCraw (1978) collected mollusks from the Illinois drainage in Arkansas. Iseley (1925) and Branson (1964, 1973) listed mollusk species from sites in Oklahoma. This paper reports mollusks from the Arkansas portion of the river.

MATERIALS AND METHODS

The Illinois River is a major drainage of the southwestern Ozark Plateaus and a principle tributary of the Arkansas River. It originates in the Boston Mountains and flows through this physiographic region for about 16 km. It then flows through the Springfield Plateau to Lake Francis on the Oklahoma-Arkansas border. Summer surface-flow begins in the vicinity of Hogeey, Washington County, Arkansas. The substrate is mainly chert gravel and rubble with areas of exposed bedrock. Mud substrate occurs in some areas due to agricultural abuses of the watershed.

Sixteen sites were sampled between Hogeey and Siloam Springs, Arkansas (Fig. 1). Qualitative collecting was done by gathering specimens from the river and banks by hand and by kick-net methods (Hynes and Hynes, 1975). Dead specimens were cleaned and stored dry. Live specimens were relaxed in Nembutal, fixed in formalin, and preserved in 70% ethanol (Kraemer, 1970). Specimens were verified by personal inspection and comparison (March 1979) with the collections at the University of Michigan Museum of Zoology, the Harvard University Museum of Comparative Zoology, and the National Museum of Natural History in Washington, D. C. Phylogeny and nomenclature follow a conservative system prescribed by Ortmann and Walker (1922), Clarke (1973), and Burch (1975). This is augmented by Ortmann (1919), Baker (1945), and Basch (1963). Vernacular names were taken from a variety of sources (e. g., Meek and Clark, 1912; Murray and Leonard, 1962; Sterki, 1910). A representative collection has been deposited in the University of Arkansas at Fayetteville Museum.

RESULTS

Nine species and one morphological subspecies of gastropods, three species of sphaeriid clams, and 23 species of unionid mussels were collected. Two species and an ecophenotype located in the University of Arkansas Museum (UAM) L. R. Kraemer collection were included. This makes a total of 39 species and forms of aquatic Mollusca from the Illinois River in Arkansas. Material in the collec-

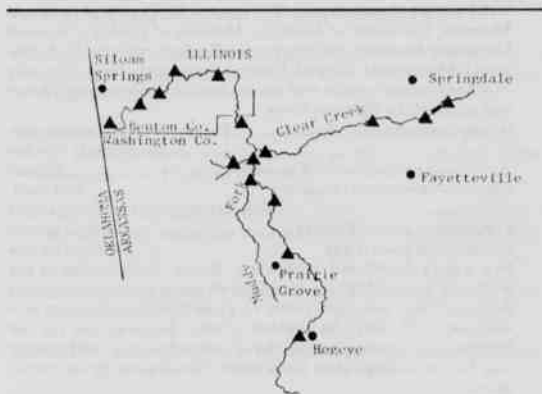


Figure 1. Collecting sites (▲) on the Illinois River, Arkansas.

tions at the University of Michigan Museum of Zoology, Harvard University Museum of Comparative Zoology, and the U. S. National Museum of Natural History confirm these findings. Headwater species were *Goniobasis potosiensis plebeius*, *Carunculina glans*, and *Ligumia subrostrata*. Commonly encountered species include *Goniobasis potosiensis plebeius*, *Quadrula pustulosa*, *Ambelma plicata*, *Actinonaias carinata*, and *Lampsilis radiata siliquoidea*. Only a single shell of *Quadrula cylindrica* was collected. Personal data from other nearby rivers suggests that *Quadrula cylindrica* is fairly rare in this area.

Class Bivalvia

Family Unionidae Fleming

- Fusconaia flava* (Rafinesque) Wabash Pig-toe
- Megaloniais gigantea* (Barnes) (UAM 76-173-2b) Washboard
- Ambelma plicata* (Say) (= *A. costata*) Washboard, Rock mussel, Three-ridge, Blue point
- Quadrula pustulosa* (Lea) Warty pig-toe, Pimple-back
- Quadrula quadrula* (Rafinesque) (UAM 76-173-3c) Maple-leaf
- Quadrula cylindrica* (Say) Cob shell, Rabbit's foot, Spectacle case
- Trigonia verrucosa* (Rafinesque) Fantail, Buckhorn, Pistol-grip
- Pleurobema cordatum coccineum* (Conrad) Round pig-toe
- Elliptio dilatatus* (Rafinesque) Spike, Lady-finger
- Lasmigona costata* (Rafinesque) Sand mussel, Fluted mussel
- Alasmidonta marginata* Say Elk-Toe
- Anodonta grandis* Say Floater

- Anodonta grandis corpulenta* (Cooper) UAM 76-173-2a) Stout Floater
 This is the slough form of *A. grandis* (van der Schalie, pers. comm.)
Anodonta imbecilis Say Paper pond shell, Floater
Strophitus undulatus (Say) Squaw-foot
 Some controversy surrounds the taxonomy of this species. Ortmann and Walker (1922) distinguish *S. undulatus* from *S. rugosus* (Swainson), the western form with *S. endentulus* (Say) as a synonym, as does van der Schalie (pers. comm.). Burch (1975) and Johnson (1970, pers. comm. 1979) contend that *S. rugosus* is a synonym of *S. undulatus*. Illinois River material may be *S. rugosus*.
Ptychobranthus occidentalis (Conrad) Kidney-shell
 This species has often been misidentified as *P. fasciolaris* (Rafinesque) (Seammon, 1906; Murray and Leonard, 1962; Branson, 1967; Gordon, pers. obs. of museum specimens). Material in the collections of L. R. Kraemer, University of Arkansas Museum, University of Michigan Museum of Zoology, Harvard University Museum of Comparative Zoology, and the U. S. National Museum of Natural History show that this is the only *Ptychobranthus* species that occurs west of the Mississippi River and south of the Missouri River.
Actinonaias carinata (Barnes) Red mucket, Green mucket, Grass mucket, Mucket
Actinonaias ellipsiformis (Conrad) Ellipse
Proptera purpurata (Lamarck) Red shell, Western heel-splitter, Purple shell
Carunculina parva (Barnes) Lilliput mussel
Carunculina glans (Lea) Little purple
 In a widely distributed publication, Burch (1975) evaluates the work of Johnson (1967) on this difficult genus and concludes that Johnson (Ibid) recognizes only *C. pulla* and *C. parva* (see also Johnson, 1970, 1972). In contrast, Clarke, Johnson, and van der Schalie (pers. comms.) agree that *C. glans* is also a valid species and can be distinguished from other *Carunculina* by its purple nacre.
Villosa lienosa (Conrad) Spectacle case
Ligumia subrostrata (Say) Common pond mussel
Lampsilis radiata siliquoides (Barnes) Fat mucket
Lampsilis rafinesqueana Frierson Neosho mucket
 The shell of this species is very easy to confuse with *Actinonaias carinata*; however, Oesch (pers. comm.) states that it possesses a mantle flap similar to that of *L. ovata ventricosa*.
Lampsilis ovata ventricosa (Barnes) Butterfly Plain pocketbook

- Family Sphaeriidae Jeffreys Fingernail and Pill clams
Sphaerium striatinum (Lamarck)
Pisidium casertanum (Poli)
Pisidium compressum Prime

Class Gastropoda

Subclass Prosobranchia

Family Hydrobiidae Troschel

Pomatiopsis lapidaria (Say)

Family Pleuroceridae Fisher

Goniobasis potosiensis plebeius (Anthony)

Subclass Pulmonata

Family Lymnaeidae Rafinesque

Lymnaea columella (Say)

Family Physidae Fitzinger

Physa gyrina (Say)

This is a difficult group. It is very possible that the southwestern form of *P. virgata* (= *P. anatina*) may be found in the Illinois River. Arkansas material from this area has been listed as *Physa gyrina aurea* var. *albofilata* (Ancey) by G. A. Te at the University of Michigan Museum of Zoology.

Family Planorbidae Rafinesque

Gyraulus parvus (Say)

Menetus dilatatus (Gould)

Menetus dilatatus buchanensis (Lea)

This is a keeled form of *M. dilatatus*. Identification is based upon information from Wu (pers. comm.) and Winslow (1918).

Helisoma trivolvis (Say)

Family Ancyliidae Rafinesque

Laevapex diaphanus (Haldeman)

Ferrissia rivularis (Say)

DISCUSSION

Previous papers dealing with the entire aquatic molluscan fauna of an Arkansas river do not exist. Wheeler (1914) studied the unionids of the Cache River, reporting 18 species, and conducted an in-depth survey of the mollusks of Clark County, Arkansas (Wheeler, 1918), which included a large portion of the upper Ouachita River and its tributaries. Meek and Clark (1912) collected 22 species of unionids from the Buffalo River. Recent unpublished collections increase this to 25 species. In the course of these field studies, it was observed that not only were the Buffalo and Illinois rivers similar in physiographic characteristics, but also that there were similarities in the unionid assemblages (Gordon, unpubl. data). Branson (1967) reported 29 unionid species and several subspecific forms from the Spring River in Missouri, Kansas, and Oklahoma (a portion of the Neosho [= Grand] River drainage basin, a principle tributary of the Arkansas River). In addition to similar unionid species, he also identified 13 species of sphaeriids and gastropods, eight of which are probably identical to species in the Illinois. Thus, regarding numbers of species, the Arkansas portion of the Illinois River appears to be comparable to other nearby Ozark streams. However, when species composition is compared, there are interesting differences.

The Ozarks region (including the Ouachita Mountains) has been considered to have a distinct molluscan faunal assemblage with endemic species (van der Schalie and van der Schalie, 1950). Several of these endemic species occur in drainages adjacent to the Illinois: *Goniobasis potosiensis plebeius*, *Ptychobranthus occidentalis*, *Fusconia ozarkensis*, *Lampsilis reeveiana* (= *L. brevicula*), and *Cyprogenia aberti*. Of these, only *Goniobasis* and *Ptychobranthus* were found in the Illinois. The White River, to the east, contains all five species. The Elk River fauna in Missouri, a tributary of the Neosho River, includes *F. ozarkensis* and *L. rafinesqueana*, the latter being apparently endemic to the Illinois and Neosho rivers drainages. These rivers are within 16 km of the Illinois. Frog Bayou, to the south, apparently holds none of these species (pers. data). Therefore, the Illinois River may represent the southwestern limit of the Ozark influence on the molluscan fauna north of the Arkansas River, with adjacent rivers to the south and west characterized by the Mississippian fauna. The limited information from the Oklahoma portion of the Illinois River (Isely 1925; Branson 1964, 1973), the situation in the Spring River (Branson, 1967), and Kansas records by Murray and Leonard (1962) support this observation.

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