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Abstract

Two freshwater mussel species thought to have been extirpated from Arkansas have recently been rediscovered in the Ouachita River in the vicinity of Camden. Prior to this survey, Wheeler (1918) last reported *Arkansia wheeleri* Ortmann and Walker, the Ouachita rock-pocketbook, and *Cumberlandia monodonta* (Say), the spectaclecase, from the Ouachita River near Arkadelphia. *Quadrula apiculata* (Lea), the southern mapleleaf, has been reported from Arkansas on two occasions, but due to taxonomic uncertainty, it has not been recognized in recent compilations of Arkansas freshwater mussels. During this survey, the southern mapleleaf was collected from the Ouachita River which verifies its occurrence within Arkansas. *Quadrula fragosa* (Conrad), the winged mapleleaf, is reported as a new state record. *Arkansia wheeleri* and *Quadrula fragosa* are listed as threatened and endangered species, respectively, by the U.S. Fish and Wildlife Service.

Introduction

Vanatta (1910) first reported on the freshwater mussels of the Ouachita River from sites near the Arkansas-Louisiana border. Wheeler (1918) reported on the freshwater mussels of the Ouachita River in the vicinity of Arkadelphia, Clark County, based on taxonomic determinations provided by L.S. Frierson, A.E. Ortmann and B.G. Walker. Wheeler (1918) listed forty taxa assignable to current species recognized by Turgeon et al. (1988) and Williams et al. (1993). Gordon et al. (1979) summarized freshwater mussel distributional data for Arkansas and found historical records for 47 species from the Ouachita River drainage proper.

Materials and Methods

Between 1992 and 1996, 234 person-days were spent conducting a systematic mussel survey of approximately 233 river kilometers of the mainstem Ouachita River from its confluence with the Little Missouri River downstream to the Arkansas-Louisiana state line. During this survey, all habitats considered suitable for mussel aggregations (beds) were searched by Hookah-rig diving and hand searching the substrate. Mussel beds were defined as areas greater than 100 meters square (m^2) with mean mussel densities >10/m^2. Initial dive searches of potential mussel bed habitat were conducted in an upstream to downstream fashion to locate and then define the bed limits. Width was measured to the nearest meter by "walking" a weighted, PVC pipe, m^2 quadrat delineator acrosss the bed, and bed length was determined to the nearest meter using a Ranging 1200 Rangematic-MK5 distance finder. Water depth was measured to the nearest 0.1 m with a Hummingbird depth finder.

Qualitative, semi-quantitative, and quantitative sampling techniques were employed, depending upon mussel bed size and mussel densities within beds. Divers manually collected mussels from m^2 sample areas defined by PVC pipe quadrat delineators and placed them in nylon mesh bags for transport to the surface. At the surface, mussels were identified; measured to the nearest 0.1 mm for length, width, and depth using vernier calipers; and massed to the nearest gram (g) using an Ohaus Model CT6000-S analytical scale. A more detailed discussion of methodology can be found in Rust (1993) and Christian (1995).

Results and Discussion

Eight hundred forty-seven m^2 samples were collected during the survey. Thirty-nine mussel species were identified from a total of approximately 23,500 specimens examined. A single *Arkansia wheeleri* was encountered 16 June 1995 at River Mile 334.0 in a mussel bed estimated to be 200 m long and 13 m wide. At the bed site, the mean river width was approximately 50 m, water depth ranged from 5.0-7.0 m, and substrate was composed of gravel, gravel/sand, and sand. The *A. wheeleri* specimen was taken from near the upstream limit of the bed at approximately mid-channel. The individual was 71.2 mm long, 54.4 mm deep and 38.3 mm wide with a wet mass of 85 g. Twenty-five randomly selected m^2 samples taken from the bed yielded 584 specimens ($\bar{x}$ = 23.4, SD = 15.2)

distributed among 22 species. In addition, one specimen of the endangered pink mucket, *Lampsilis abrupta* (Say), was encountered in this bed.

Wheeler (1918) collected *Arkansia wheeleri* from Old River, an oxbow lake of the Ouachita River near Arkadelphia, and from the Ouachita River below Arkadelphia. Harris and Gordon (1987) considered *A. wheeleri* as possibly extirpated from Arkansas; however, Clarke (1987) subsequently located live *A. wheeleri* in an eight km reach of Little River downstream of the Arkansas-Oklahoma border. It was considered endangered in North America by Williams et al. (1993) and receives protection afforded threatened species by the Endangered Species Act (USFWS, 1991a). The Kiamichi River, OK, apparently supports the largest remaining population of *A. wheeleri* which was estimated to consist of approximately 1,000 individuals (Mehlhop-Cifelli and Miller, 1989; USFWS, 1991a).

Clarke (1987) summarized *Arkansia wheeleri* habitat as "typically in muddy coves or backwaters adjacent to riffles, or at the least close to areas of moderate to rapid current". Mehlhop-Cifelli and Miller (1989) and Vaughn et al. (1993) found that *A. wheeleri* only occurs in pools with rock substrate. Vaughn et al. (1993) stated that *A. wheeleri* only occurs in large mussel beds in association with other mussel species.

The single *A. wheeleri* specimen collected during this survey came from a 2600 m^2 mussel bed with 21 mussel species associates. At the Mile 334.0 bed site, the Ouachita River has an upstream drainage area of approximately 14,500 km^2 (Yanchosek and Hines, 1979). The total watershed of the Kiamichi River, OK, is approximately 4750 km^2, and *A. wheeleri* studied by Vaughn et al. (1993) occurred at six sites with depths ranging from 0.3-1.2 m. The discovery of *A. wheeleri* from the Ouachita River below Camden, AR, indicates that the species can occur in larger rivers than previously documented.

Qualitative collections yielded two *Cumberlandia monodonta* specimens from downstream of the Ouachita - Little Missouri River confluence. The first specimen was collected on 24 October 1992 at River Mile 375.1 in water approximately 1.0 m deep with sand/gravel substrate. It was found under branches of a large, downed tree aproximately five m from the bank, and mussel densities were estimated to be $<5.0/m^2$. This first specimen measured 148.7 mm long, 52.6 mm deep, and 38.1 mm wide and had a wet mass of 136 g. The second specimen was collected on 18 July 1993 at River Mile 364.1 in water approximately 3.0 m deep with gravel, cobble, cracked rock, and boulder substrate. This specimen was 121.0 mm long, 46.7 mm deep, and 29.0 mm wide and was also taken in an area with mussel densities estimated to be $<5.0/m^2$.

Prior to this survey, *Cumberlandia monodonta* was known only from the Ouachita River near Arkadelphia, Clark County (Wheeler, 1918). Harris and Gordon (1987) considered *C. monodonta* as possibly extirpated from Arkansas since no live or relict specimens had been recorded since Wheeler's collections. Williams et al. (1993) considered the widespread but uncommon *C. monodonta* threatened within North America.

Quadrula apiculata was collected from multiple sites between River Miles 353.7 and 221.2. A total number of six specimens was identified as *Q. apiculata*. *Quadrula fragosa* was taken from multiple collecting sites between river miles 376.0 and 240.0. Five specimens were identified as *Q. fragosa*. These species were originally identified as *Q. quadrula* and placed in composite voucher containers. Therefore, exact localities are not available for all specimens. However, vouchers taken from the River Mile 335.5 mussel bed represented both species.

Quadrula apiculata (Say) was recorded (as *Q. aspera*) from Old River near Arkadelphia by Wheeler (1918). Cooper (1948) listed *Quadrula apiculata* as occurring in Lake Chicot, Chicot County, AR; however, Harris et al. (1993) did not find *Q. apiculata* in their survey of Lake Chicot. Gordon et al. (1979), Harris and Gordon (undated), and Williams et al. (1993) all failed or refused to recognize the southern mapleleaf's occurrence in Arkansas. Vidrine (1993) showed the species occurring in the Ouachita River drainage in Louisiana.

Quadrula fragosa (Conrad) historically occurred in 10 (USFWS, 1991b, Williams et al., 1993) to 12 states (Hay et al., 1995) within the Mississippi, Tennessee, Ohio and Cumberland River drainages. When listed as an endangered species by the U.S. Fish and Wildlife Service (1991b), the winged mapleleaf was known to exist in only a single population in the St. Croix River between northwestern WI and east/central MN. Five specimens of *Q. fragosa* were collected during this survey.

There is considerable taxonomic disagreement among malacologists regarding *Q. apiculata* and *Q. fragosa*. Electrochemical analyses are underway to elucidate taxonomic relationships of *Q. fragosa* and *Q. apiculata* in the Ouachita River drainage, Arkansas.

Conclusions

Arkansia wheeleri Ortmann and Walker, *Cumberlandia monodonta* (Say), and *Quadrula apiculata* (Say) had not been reported from the Ouachita River as living specimens since the Wheeler (1918) survey conducted from 1910-1913. *Quadrula fragosa* (Conrad) has not been previously reported from Arkansas. Our 1992-1996 survey confirms the continued existence of these four species in Ouachita River, AR. The addition of *Q. apiculata* and *Q. fragosa* to the state molluscan fauna brings the total num-

ber of native unionids recognized in Arkansas to 74 species.

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Literature Cited

Christian, A.C. 1995. Analysis of the commerical mussel beds in the Cache and White Rivers in Arkansas. M.S. thesis, Arkansas State University, Arkansas. 197 pp.

Clarke, A.C. 1987. Status survey of *Lampsilis streckeri* and *Arcidens* (*Arkansia*) *wheeleri* (Ortmann & Walker, 1912). Ecosearch, Inc. Final Report to the USFWS, Office of Endangered Species, Jackson, Mississippi. 24 pp. + appendix.

Cooper, C.M. 1984. The freshwater bivalves of Lake Chicot, an oxbow of the Mississippi in Arkansas. The Nautilus 98:142-145.

Gordon, M.E., L.R. Kraemer and **A.V. Brown.** 1979. Unionacea of Arkansas: historical review, checklist, and observations on distributional patterns. Bull. Amer. Malacol. Union 1979:31-37.

Harris, J.L. and **M.E. Gordon.** Undated. Arkansas mussels. Arkansas Game and Fish Commission, Little Rock. 32 pp.

Harris. J.L. and **M.E. Gordon.** 1987. Distribution and status of rare and endangered mussels (Mollusca: Margaritiferidae, Unionidae) in Arkansas. Proc. Arkansas Acad. Sci. 41:49-56.

Harris, J.L., P. Rust, S.W. Chordas, III and **G.L. Harp.** 1993. Distribution and population structure of fresh water mussels (Unionidae) in Lake Chicot, Arkansas. Proc. Arkansas Acad. Sci. 47:38-43.

Hay, R.W., D.J. Hornbach, S.L. Johnson and **G.A. Miller.** 1995. Distribution, status of life history of the winged mapleleaf mussel *Quadrula fragosa* in the St. Croix River Minnesota and Wisconsin. Final Report to the U.S. Fish & Wildlife Service, Twin Cities Field Office, St. Paul, Minnesota. 205 pp.

Mehlhop-Cifelli, P. and **E.K. Miller.** 1989. Status and distribution of *Arkansia wheeleri* Ortmann & Walker, 1912 (syn. *Arcidens wheeleri*) in the Kiamichi River, Oklahoma. Report to U.S. Fish and Wildlife Service, Tulsa, Oklahoma.

Rust, P.J. 1993. Analysis of the commercial mussel beds in the Black, Spring, Strawberry and Current Rivers in Arkansas. M.S. thesis, Arkansas State University, Jonesboro, Arkansas. 118 pp.

Turgeon, D.D., A.E. Bogan, E.V. Coan, W.K. Emerson, W.G. Lyons, W.L. Pratt, C.F.E. Roper, A. Sheltema, F.G. Thompson and **J.D. Williams.** 1988. Common and scientific names of aquatic invertebrates from the United States and Canada: mollusks. Am. Fisheries Soc. Special Pub. 16.

U.S. Fish and **Wildlife Service.** 1991a. Endangered and threatened wildlife and plants; Final rule to list the Ouachita rock-pocketbook (mussel) as an endangered species. Fed. Register 56(205):54950-54957.

U.S. Fish and **Wildlife Service.** 1991b. Endangered and threatened wildlife and plants; Determination of endangered status for the winged mapleleaf freshwater mussel. Fed. Register 56(119):28345-28349.

Vanatta, E.G. 1910. Unionidae from southeastern Arkansas and northeastern Louisiana. The Nautilus XXIII:102-104.

Vaughn C.C., M. Pyron and **D. Certain.** 1993. Habitat use and reproductive biology of *Arkansia wheeleri* in the Kiamichia River, Oklahoma - Final Report. Unpublished report to the Oklahoma Department of Wildlife Conservation, Oklahoma City, Oklahoma. 104 pp.

Vidrine, M.F. 1993. The historical distributions of fresh water mussels in Louisiana. Gail Q. Vidrine collectables, Eunice, Louisiana. 225 pp.

Williams, J.D., M.L. Warren, Jr., K.D. Cummings, J.L. Harris and **R.D. Neves.** 1993. Conservation status of freshwater mussels of the United States and Canada. Fisheries 18(9):6-22.

Wheeler, H.E. 1918. The Mollusca of Clark County, Arkansas, The Nautilus XXXI(4):109-125.

Yanchosek, J.J. and **M.S. Hines.** 1979. Drainage areas of streams in Arkansas. Ouachita River basin. U.S. Geological Survey Open-file Report 80-334. 87 pp.

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