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GENERAL NOTES

A Survey of Mollusca (Bivalvia: Unionacea) Inhabiting Myatt Creek, Fulton County, Arkansas

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Introduction

The past century has marked an alarming decline in native Unionacea populations in the United States. Their decline can be attributed to a variety of threats with habitat destruction being the single most important factor. Overutilization for commercial purposes, disease, predation, introduction of exotic species, pollution and hybridization are also threats. Unionacea are important indicators of aquatic environment health and are a major component of freshwater biodiversity (Williams et al., 1993). A description of the distribution of Unionacea in Myatt Creek will establish a basis for monitoring this resource in the study stream.

Myatt Creek originates on the Salem Plateau of the Ozark Mountains Physiographic Province in southern Missouri and drains southeasterly through Howell County, Missouri, and Fulton County, Arkansas, before reaching its confluence with the Spring River near Hardy. This physiographic province is composed of limestone and dolomite deposits of Ordovician origin (Croneis, 1930). Myatt Creek is a spring-fed, relatively pristine stream consisting of alternating pool-riffle biocies with gravel, bedrock and sand being the dominant substrates, in that order.

No studies pertaining specifically to the Unionacea of Myatt Creek have been conducted. Previous studies of this creek have superficially addressed fishes and aquatic insects (Beadles, 1972; Arkansas Game and Fish Commission, 1995). Gordon et al. (1980) and Rust (1993) have reported 45 species of Unionacea from the Spring River, compared to 19 found in Myatt Creek. The purposes of this paper are to present a species list, delineate distributions and report numerical standing crop data for each site.

Materials and Methods

During August and September, 1996, a 23.2 km section of Myatt Creek (Sites 1-11) was surveyed by canoe from a road crossing upstream of St. Hwy. 9 (SE 1/4 NE 1/4 S26, T21N, R7W) to the confluence of Wolf Creek with Myatt Creek (SE 1/4 NW 1/4 S 19, T20N, R5W). A second section (Δ U) was surveyed from approximately 0.8 km north to 0.8

km south of a road crossing in northern Fulton County (NW 1/4 SE 1/4 S14, T21N, R7W), and a third section (Δ L) from approximately 0.8 km upstream to the road crossing approximately 1.0 km north of St. Hwy. 9 (SE 1/4 NE 1/4 S26, T21N, R7W; Figure 1) was also sampled. Sampling methods included wading and snorkeling.

Generally, a concentration of shells was defined as an estimated area $\geq 5 \text{ m}^2$ with ≥ 3 live Unionacea or an area with numerous freshly dead shells. When a concentration was located, all specimens encountered were identified and returned to the substrate except for voucher specimens. Location, substrate type, water depth and any other pertinent site information were recorded. Oesch (1984) was used to identify specimens which could not be field identified. Voucher specimens are cataloged and housed in the Unionacea Collection of the Arkansas State University Museum of Zoology.

Site locations and a brief description of each are as follows:

1. Site 1. NW 1/4 S25, T21N, R7W. Shoal with water depths ranging from 0.2-1.0 m; gravel substrate.

2. Site 2. NW 1/4 SE 1/4 S25, T21N, R7W. Shallow riffle approximately 75 m below a large, deep pool; sand with gravel or bedrock substrate.

3. Site 3. SE 1/4 SW1/4 S30, T21N, R6W. Approximately 200 m downstream of the St. Hwy. 9 bridge. Site a shallow riffle; gravel/sand substrate.

4. Site 4. SW 1/4 SE 1/4 S30, T21N, R6W. Backwater area where spring-fed tributary enters Myatt Creek. Site considerably cooler than the main channel of Myatt Creek.

5. Site 5. S31, T21N, R6W. Approximately 0.8 km below Site 4. Shoal habitat.

6. Site 6. NE 1/4 SE 1/4 S31, T21N, R6W. Shoal divided by a small island at low water. Mussels located on the left-hand descending channel.

7. Site 7. NW 1/4 SE 1/4 S8, T20N, R6W. Shallow pool ($< 1 \text{ m}$) between two riffles; substrate silt over sand with gravel; numerous lily pads present.

8. Site 8. NE 1/4 NE 1/4 S5, T20N, R6W. Second shoal upriver spring-fed creek and at confluence of creek and Myatt Creek.

9. Site 9. NE 1/4 SW 1/4 S3, T20N, R6W. Left-hand

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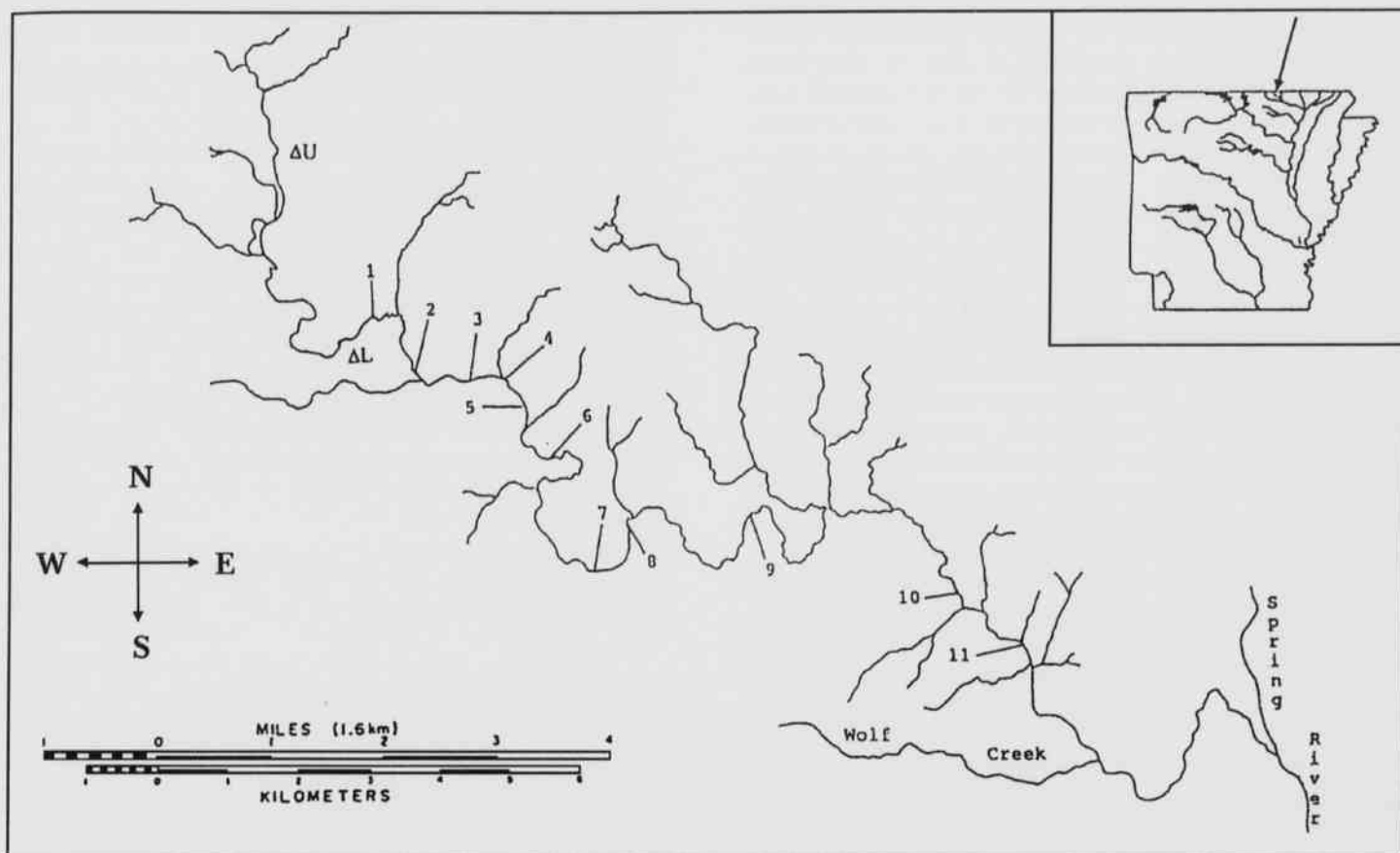


Fig. 1. Site locations for Unionacea from Myatt Creek, Fulton County, Arkansas, 1996. h = Road crossing, U = upper; L = Lower

descending bank in large pool approximately 300 m upstream from a bluff. Similar to Site 7 except 0.1 m more silt at this site.

10. Site 10. SW 1/4 S12, T20N, R6W. Area at the head of 200 m long island.

11. Site 11. S13, T20N, R6W. Head of a shoal, substrate sand with gravel.

Results and Discussion

Nineteen species represented by 314 individuals (120 live individuals and 194 relicts) were collected during this survey. Of the 19 species, 10 were found only as relicts. Sites 2 and 7 yielded the greatest number of live individuals, while species richness was greatest at Sites 7, 8 and 10. *Ptychobranthus occidentalis* was the most abundant species (46.7%), followed by *Venustaconcha ellipsiformis* (13.3%) and *Lampsilis reeviana* (12.5%).

Williams et al. (1993) listed seven Myatt Creek species as endangered (*Leptodea leptodon*), threatened (*Lampsilis reeviana* and *Ptychobranthus occidentalis*) or of special concern (*Alasmidonta viridis*, *Lampsilis cardium*, *Fusconaia ozarkensis*

and *Venustaconcha ellipsiformis*). Myatt Creek is presently or historically within the range of three federally listed endangered species which were not collected in this survey: *Epioblasma florentina*, *Epioblasma turgidula* and *Lampsilis abrupta* (Harris and Gordon, 1987).

Unionacea were found in sparse concentrations (< 10/m²) throughout Myatt Creek. Densities were the greatest at Sites 2 (1-5 mussels/m²), 6 (3-10 mussels/m²) and 7 (1-8 mussels/m²). The areas of concentration at Sites 2, 6 and 7 were approximately 25-35 m², 15-25 m² and 35-45 m², respectively. The remaining sites all had mean densities of < 1 mussel/m² (Table 1). It was characteristic of all sites to find the shells located close to the shoreline and associated with aquatic vegetation.

No live specimens were found between Site 9 and 10, a distance of approximately 10 km. There were no signs of anthropogenic impacts, so more detailed studies may be needed to determine if this is a natural or anthropogenically induced absence. Site 10 had a concentration of relicts plus one live specimen of *Lampsilis reeviana*.

Two sites (6 and 11) had recently suffered massive die-offs. The die-off at Site 6 appeared to be a result of low water. Mussels at this site were located at the water's edge,

and low water appeared to threaten the survival of the remaining individuals. Mortality at Site 11 was 100%. Densities of 3-8 dead mussels/m² in the live position were found at this site, and there was no obvious cause of death.

Ptychobranthus occidentalis was the only species present at all sites. Three species, *Lampsilis cardium*, *Lampsilis reeviana* and *Venustaconcha ellipsiformis*, were present at $\geq 80\%$ of the sites. The only trend the data show in Table I is an increasing number of relicts towards the mouth. Substrate and water levels were similar to those found in the upper reaches, so there is no immediately apparent cause for this trend.

No live specimens were found at either of the two road crossings. However, at the uppermost (northern most) road crossing, four relicts were found: *Lampsilis cardium* (1), *Lampsilis reeviana* (1) and *Ptychobranthus occidentalis* (2). The absence of living Unionacea at these sites is not immediately explainable. Anthropogenic influences do not appear to be extreme, nor is the habitat obviously unsuitable.

As a whole, those species of Unionacea collected in this survey are generally widespread in distribution (Oesch, 1984; Harris and Gordon, undated). Gordon et al. (1980) and Rust (1993) reported a greater diversity of Unionacea

from the Spring River compared to that found in Myatt Creek. Spring River has a larger watershed and offers a greater diversity of habitats which accounts for a greater diversity of species. Five species found in this survey, *Alasmidonta viridis*, *Lampsilis siliquoidea*, *Leptodea leptodon*, *Venustaconcha ellipsiformis* and *Villosa iris*, were not reported for the Spring River by Rust (1993). Four of these species are generally restricted to stream headwaters, but *Lampsilis siliquoidea* is not (Oesch, 1984). Rust (1993) surveyed the lower 11 miles of the Spring River, which may account for the absence of *Lampsilis siliquoidea* from Rust's survey. Another explanation for the absence of this species from Rust's (1993) study is that it may be an uncommon species in the Spring River. With this species list and description of locations, a more comprehensive management plan can be designed for the sustained viability of the aquatic resources of Myatt Creek.

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Table 1. Live/dead Unionacea collected from Myatt Creek, Fulton County, Arkansas, 1996.

Species	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Other
<i>Amblema plicata</i>							12/3	0/4	0/2	0/1		
<i>Actinonaias ligamentina</i>												R*
<i>Alasmidonta viridis</i>												R
<i>Elliptio dilatata</i>											0/3	
<i>Fusconaia flava</i>		1/0				2/0		0/2				
<i>Fusconaia ozarkensis</i>	0/2					0/2					0/1	
<i>Lampsilis cardium</i>		1/0	2/2	2/0	2/4	0/1	3/5	1/7	2/1	0/3	0/1	
<i>Lampsilis reeviana</i>		6/0	1/1	0/1	1/1	0/1	4/2	2/3		1/3		
<i>Lampsilis siliquoidea</i>							1/0	1/0		0/1		
<i>Lasmigona costata</i>					0/1	0/1	1/0	0/1	0/2	0/2		
<i>Leptodea leptodon</i>												R
<i>Pleurobema coccineum</i>						0/1						
<i>Potamilus purpuratus</i>											0/1	
<i>Ptychobranthus occidentalis</i>	0/4	20/1	3/6	5/2	0/5	10/19	10/4	7/8	1/1	0/7	0/16	
<i>Quadrula pustulosa</i>							0/2			0/1		
<i>Strophitus undulatus</i>		1/0					1/0			0/1		
<i>Venustaconcha ellipsiformis</i>		8/1	4/0	0/2		2/3	2/7	0/5		0/5	0/11	
<i>Villosa iris</i>				0/2						0/1		
<i>Villosa lienosa</i>									0/1			
Total	0/6	37/2	10/9	7/7	3/11	14/28	34/23	11/32	3/7	1/25	0/33	

*R = Relicts found at non-specified locations.

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