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UNIONID MOLLUSKS OF THE MISSOURI RIVER ON THE NEBRASKA BORDER

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ABSTRACT

The Missouri River, bordering Nebraska, has previously been reported to be uninhabitable for unionid mollusks. Studies conducted in the Missouri River and its backwaters, primarily during 1981 and 1982, revealed the presence of thirteen species and subspecies of unionid mollusks. The apparent absence of any extensive prior unionid work in the Missouri River may explain the discrepancy between this and previous literature.

Little has been written on the unionid fauna of the Missouri River in general, and almost nothing on that portion of the river bordering Nebraska. Collections were reported during the nineteenth century from the Great Falls of the Missouri River in Montana (Cooper, 1870), and at Fort Clark in North Dakota (Lea, 1858; Hayden, 1862). In Missouri, Utterback (1915–1916) collected one species in sloughs and bayous along the Missouri River, but he was insistent that no unionids occurred in the river proper. More recently, Cvancara (1975) reported an absence of unionids in the North Dakota sector of the Missouri River.

In that portion of the Missouri River contiguous to Nebraska, no previous literature is available to document the presence of unionids. Aughey (1877) does not mention the river, and there is no evidence to suggest that he collected in the Missouri River. More recent workers (Coker and Southall, 1915; Over, 1915, 1942) have described this portion of the Missouri River as devoid of unionids.

The current paper is an outgrowth of a continuing and presently unpublished study of the unionid fauna of Nebraska. Until 1976, this study had proceeded under the assumption that unionids did not inhabit the Missouri River. At that time, a questionnaire was distributed to conservation officers in Nebraska requesting information on the location of known populations of unionid mollusks in the state. Comments received in response indicated the presence of numerous populations in backwater areas of the Missouri River and suggested the need for a survey.

METHODS

The goals of this study were to document, through limited sampling, the presence of unionids in the Missouri River and adjoining and disjunct backwaters, and to gain a general understanding of the species present. The area selected for the survey extends from Santee, Nebraska to the confluence of the Platte and Missouri Rivers below Omaha (Fig. 1). The diversity of habitat in this sector of the Missouri River made it an ideal area for initial survey work. Included in the survey area are a reservoir (Lewis and Clark Lake), backwaters, oxbow lakes, and both channelized and unchannelized portions of the Missouri River.

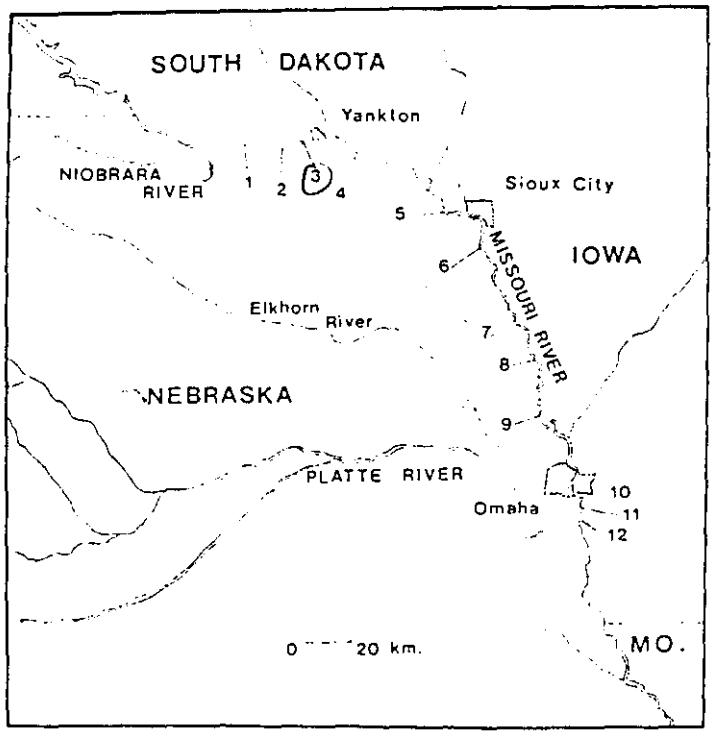

Fig. 1. Survey area and sites collected.

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Collection sites were determined primarily by accessability, and sites were sampled under low water conditions by hand or with the use of a rake. An attempt was made to obtain collections from all major habitats present in the survey region (Table 1). A number of sites were collected by area biologists. In addition, museum collections were examined for relevant specimens at the following institutions: the Ohio State University Museum of Zoology; the University of Nebraska at Omaha; and the Nebraska State Museum in Lincoln, Nebraska.

One species, *Tritogonia verrucosa* (See Table 2 for authors and dates of taxa), was identified solely by the writer. The identifications of voucher specimens of all other species recovered were corraborated by Dr. David H. Stansbery, Ohio State University Museum of Zoology, and specimens documenting this study have been deposited at that institution. The nomenclature used in this paper is that employed by Dr. Stansbery.

RESULTS

Initial survey work at ten collection sites resulted in the recovery of 11 species from the Missouri River and its backwaters. An examination of records at the Ohio State University Museum of Zoology and the University of Nebraska at Omaha resulted in the addition of one subspecies, *Anodonta*

Table 1. Collection sites.

Site	Location	Environment	Year
1	Lewis and Clark Lake, 1.3 km. east of Santee, Nebraska, Knox County, Nebraska	Backwaters of reservoir	1981
2	Lewis and Clark Lake at and above mouth of Weigand Creek, Knox County, Nebraska	Reservoir	1981
3	Missouri River, 1.0 km. east of Gavin's Point Dam, Yankton County, South Dakota	Missouri River, in current	1982
4	Missouri River, 1.3 km. above the mouth of Bow Creek, Cedar County, Nebraska	Missouri River (unchannelized)	1977
5	Missouri River mile 745.8, Dixon County, Nebraska	Missouri River (unchannelized)	1976
6	Omadi Bend, 6.4 km. NE of Homer, Nebraska, Dakota County, Nebraska	Oxbow of the Missouri River	1974
7	Missouri River, 8.8 km. ESE of Decatur, Nebraska, Burt County, Nebraska	Missouri River and backwaters	1981
8	Missouri River, 11.2 km. ENE of Tekamah, Nebraska, Burt County, Nebraska	Backwaters of the Missouri River	1981
9	Cottonwood Marina, 5.5 km. NNE of Blair, Nebraska, Washington County, Nebraska	Backwater area	1981
10	Missouri River, 1.0 km. south of U.S. 275 bridge, Pottawattamie County, Iowa	Missouri River (channelized)	1981
11	Hidden Lake, Fontenelle Forest Nature Preserve, Bellevue, Nebraska	Oxbow Lake (Dry)	1981
12	Missouri River, at Sarpy County—Cass County line	Missouri River (channelized)	1981

Table 2. Unionid mollusks collected.

Unionid Mollusks	Collection Sites 1	2	3	4	5	6	7	8	9	10	11	12	Species Frequency
Anodonta suborbiculata (Say, 1831)	—	—	—	—	—	D	—	F	F	—	—	—	25.0%
Anodonta grandis grandis (Say, 1829)	—	L	L	—	M	—	L	—	F	L	D	—	58.3
Anodonta grandis corpulenta Cooper, 1834	—	—	—	—	M	—	—	—	—	—	—	—	8.3
Lasmigona complanata (Barnes, 1823)	D	D	L	—	M	—	L	—	—	—	—	—	41.7
Tritogonia verrucosa (Rafinesque, 1820)	—	—	—	M	—	—	—	—	—	—	—	—	8.3
Quadrula quadrula (Rafinesque, 1820)	—	D	D	—	—	—	—	—	—	—	—	—	16.7
Truncilla truncata (Rafinesque, 1820)	—	L	L	—	—	—	—	—	—	—	—	—	16.7
Truncilla donaciformis (Lea, 1827)	—	—	D	—	—	—	—	—	—	—	—	—	8.3
Leptodea leptodon (Rafinesque, 1820)	—	—	F	—	—	—	—	—	—	—	—	—	8.3
Leptodea fragilis (Rafinesque, 1820)	—	F	L	—	M	—	F	—	—	L	—	L	50.0
Potamilus alatus (Say, 1817)	—	—	L	—	—	—	—	—	—	—	—	—	8.3
Potamilus ohiensis (Rafinesque, 1820)	D	F	L	—	M	—	L	F	F	—	—	L	66.7
Lampsilis teres teres (Rafinesque, 1820)	—	—	—	—	—	—	E	—	—	—	—	—	8.3
Number of Species Collected by Site	2	6	9	1	5	1	5	2	3	2	1	2	

L = live F = fresh dead M = museum specimen D = recent dead E = eroded dead shell

grandis corpulenta, and one species, *T. verrucosa*, respectively to the preliminary species list obtained during the survey. All of the species recovered (Table 2) represent new published records for the Nebraska sector of the Missouri River, and at least ten represent new records for the entire Missouri River. *Anodonta g. grandis* was previously reported by Utterback (1915–1916) in sloughs and bayous of the Missouri River in Missouri, and *A. g. corpulenta* was reported for the Missouri River by Simpson (1900). *Leptodea fragilis* may have previously been collected from the Missouri River, however, the writer was unable to verify Simpson's related record as given by Utterback (1915–1916). It is anticipated that additional species will be added to the current species list as research on the Missouri River proceeds.

Although unionids were found at every site collected, the species diversity at most sites was low. Species collected per site ranged from a low of one to a maximum of nine with an average of 3.3 species per site. Collecting conditions at site 1 probably adversely affected the sampling activities at that site, while a ten foot drop in the level of the Missouri River at site 3 was partially responsible for the relatively high number of species represented in the collection from that site. Despite these potential variations, it is believed that the collections at most sites are probably representative of the local unionid fauna. The low number of species recovered from sites 10, 11, and 12 probably reflects the impact of the channelization of the Missouri River at these sites and the resultant elimination of habitat.

Potamilus ohiensis, Anodonta g. grandis and Leptodea fragilis, were the most common species found, and were collected in practically all habitats sampled. *Anodonta g. grandis* and *P. ohiensis* were most abundant in quiet backwaters of the Missouri River and in Lewis and Clark Lake, while *L. fragilis* was the most abundant species at sites 3 and 12 in the current and substrate of the Missouri River proper. *Lasmigona complanata*, while widely distributed in the survey area, was not abundant at any collection site.

The recovery of specimens of *Anodonta suborbiculata* represents the first record of this species in Nebraska in more than a century. It has previously been reported by Aughey (1877) for the Elkhorn and Blue (probably the Big Blue) Rivers, but has not been reported in the Nebraska sector of the Missouri River. *Anodonta suborbiculata* was found in relatively quiet backwaters with sand or soft mud bottoms. It was not present in backwaters that were even infrequently subjected to the strong currents of the Missouri River.

The discovery of *Leptodea leptodon* is of particular interest since this species is currently under review for possible inclusion in the U.S. List of Endangered and Threatened Wildlife and Plants. A single fresh dead specimen was found at site 3, and represents the only such specimen in almost fifteen hundred unionids examined at that site. A report of *L. leptodon* (as *Unio tenuissimus*) in the Nemaha River (Aughey, 1877) appears to be the only other published record of this species in the Missouri River Basin.

DISCUSSION

The results of this study contrast sharply with statements made in previous literature. Other workers have reported an absence of unionid mollusks from the Missouri River and have attributed this to the high silt content of the river's waters (Over, 1915, 1942; Utterback, 1915–1916, 1917; Bartsch, 1916). Though Hayden (1862) collected some unionids from the Missouri River, he also reported the river to be so turbid that living mollusks seldom occurred.

Within the past forty years, the construction of six major dams on the Upper Missouri River has resulted in a dramatic decrease in the silt content of the river's waters as silt loads have settled on the impoundment substrates. It is thus possible that the decrease in silt has enabled unionid mollusks to colonize a formerly uninhabitable environment. Any such conclusion presupposes, however, that early research was extensive enough to document their former absence from the Missouri River.

An examination of the relevant literature provides no indication of the extent of previous collection efforts on the Missouri River. In fact, there are no published statements to suggest that any determined effort has ever been made to document the status of unionids in the Missouri River. Coker and Southall (1915) did not collect in the Missouri River and dismissed it as a possible habitat for unionids. Over (1915, 1942) devoted only one sentence to the subject in each of his publications, and gave no indication of the extent of research effort involved in arriving at his conclusions. Bartsch (1916) described the Missouri River as a faunal barrier to unionids based solely upon the absence of unionids in the Mississippi River below St. Louis, Missouri and the high silt content of the Missouri River at its confluence with the Mississippi River. There is no indication that Bartsch conducted any related survey work in the Missouri River. Utterback (1915–1916, 1917) viewed the Missouri River as a faunal barrier to unionid life, but provided no indication of related collection activities.

While early statements describing the Missouri River as uninhabitable for unionids may have been correct, they do not appear to have been supported with extensive survey work. In fact, some of Utterback's collections seem to point toward the presence of unionids in the Missouri River. Of particular interest are collections of unionids from oxbow lakes of the Missouri River near St. Joseph, Missouri (Utterback, 1915–1916). The unionid fauna reported for these lakes is similar to that found during the current study, and suggests that a comparable fauna may have been present in the Missouri River and its backwaters at that time. It is possible that the high silt content of the Missouri River may have been less detrimental to unionids than has previously been assumed.

CONCLUSIONS

It is difficult to reconcile the results of the current study with statements made in previous literature. While others

have reported the Missouri River to be without unionid life, results of the current study revealed the presence of thirteen species and subspecies. Though it is possible to explain this discrepancy as the product of a recent decline in the silt content of the Missouri River, the apparent absence of extensive previous work in the Missouri River may be a more probable explanation.

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