

**the
ohio
state
university**

research foundation

1314 kinnear road
columbus, ohio
43212

STATUS OF ENDANGERED FLUVIATILE MOLLUSKS
IN CENTRAL NORTH AMERICA

QUADRULA INTERMEDIA (CONRAD, 1836)

September, 1976

U. S. Department of the Interior
Fish & Wildlife Service
Bureau of Sport Fisheries & Wildlife
Washington, D. C. 20240

Contract No. 14-16-0007-755



The
Ohio
State
University

Research Foundation

1314 Kinnear Road
Columbus, Ohio
43212

STATUS OF ENDANGERED FLUVIATILE MOLLUSKS
IN CENTRAL NORTH AMERICA

QUADRULA INTERMEDIA (CONRAD, 1836)

by

David H. Stansbery
The Ohio State University Museum of Zoology
Columbus, Ohio 43210 U.S.A.
September, 1976

for

U. S. Department of the Interior
Fish & Wildlife Service
Bureau of Sport Fisheries & Wildlife
Washington, D. C. 20240

Contract No. 14-16-0007-755

QUADRULA INTERMEDIA (CONRAD, 1836).

Synonymy

Unio intermedius Conrad, 1836. Original Description: Monography of the Family Unionidae, . . . 1(7):63, pl. 35, fig. 2. Further Description: Simpson, Descriptive Catalogue of the Naiades, 1914:837. Type Locality: ". . . by Dr. S. Blanding, of Columbia, S. C., from Nolachucky river, Tennessee, . . ." (Conrad, 1836:63). Primary Types: "Lectotype, here selected, ANSP 41606, lowest shell in cited fig." (Johnson and Baker, 1973:159).

Margarona (Unio) intermedius (Conrad, 1836). Lea, 1852, Synopsis Family Naiades:22; Lea, 1870, Synopsis Family Unionidae:33.

Quadrula intermedia (Conrad, 1836). Simpson, 1900, Synopsis of the Naiades:775; Simpson, 1914, Descriptive Catalogue of the Naiades:837.

Orthonymus intermedius (Conrad, 1836). Haas, 1969, Superfamilia Unionacea:310.

Taxonomic Status

The only taxonomic question involving this form, on the species level or below, is its relationship to Q. tuberosa (Lea, 1840) and Q. sparsa (Lea, 1841). Both these latter forms are or were found within the range of Q. intermedia and resemble it at least superficially. Whether these forms are actually or potentially inter-fertile is not known. The complete absence of intermediate specimens indicates that these forms are good species. Since Q. sparsa is rare and Q. tuberosa is probably extinct, it seems unlikely that their taxonomic status will change in the foreseeable future.

Diagnostic Characteristics

This species has the general form of the Q. cylindrica complex (=Group of Quadrula metanevra of Simpson, 1914:832) (=the Genus Orthonymus Agassiz, 1852) and is sub-quadrate to sub-triangular in outline. The posterior ridge extends from the umbos to the post-ventral margin where it forms the lower of two posterior lobes which together form the extreme posterior margin of the shell. In Q. metanevra, Q. sparsa and Q. tuberosa the postventral lobe is the most produced and the posterior ridge which forms this lobe is a sharper, more prominent feature of the shell. It differs further from Q. metanevra in being typically more compressed, in lacking the development of knobs on the posterior ridge, in having more numerous and smaller tubercles and in the characteristic triangular green markings of the periostracum being smaller, more numerous and frequently forming zig-zag or wavy patterns extending across nearly, if not all, of the surface of the disc.

Former Distribution

The former distribution is uncertain in parts of the Tennessee River system (the potential range of this species) because Ortmann, who was responsible for many, if not most, of the records from this same area, placed Q. tuberosa and Q. sparsa into the synonymy of Q. intermedia. His records for Q. intermedia may, therefore, be any one or a combination of these three species. This action was taken in 1918 and has been followed by most students up to at least the present decade. No publication exists which delineates these three "sibling" species since that of Simpson (1914:836-838).

An examination of the pre-1960 literature reveals that the range of Q. intermedia is restricted to the upper Tennessee River system (Simpson, 1914:837) (Haas 1969:310). It has been recorded from the Clinch (Lewis, 1871:218) (Call, 1885:32) (Ortmann, 1918:541), Holston (Lewis, 1871:218) (Call, 1885:33) (Ortmann 1918:541) and Nolichucky (Conrad, 1836:63) (Jay, 1852:60) (Call, 1885:32) Rivers of the upper Tennessee system. From the lower Tennessee system it has been listed from the Duck River (Marsh 1885:5) (Ortmann, 1924:17) (van der Schalie, 1973:46). It was found by Athearn (1972:TVA) in the Little Tennessee. Records from the Tennessee River proper are limited to Tuscumbia (Call, 1885:33), Tuscumbia and Florence (Hinkley, 1906:54) and Mussel Shoals (Ortmann 1924:17). The specimen from the Tennessee River at Bridgeport, Alabama, is termed by Ortmann (1924:17) "the form called tuberosa Lea." Since Q. tuberosa is so recognized by Ortmann and Q. sparsa is so rare, it seems probable that most of Ortmann's records for Q. intermedia in 1918, 1924 and 1925 were indeed of that species in the strict sense, and so these records have been added to the distribution map included herein.

Recent Distribution

Specimens collected since 1960 include those reported from the Duck River by Isom and Yokley (1969:39) and Stansbery (1970:13); from the Elk River by Isom, Yokley and Gooch (1973:439, 440) and Stansbery (1970:13) and from the Powell and Clinch rivers by Stansbery (1970:13).

Specimens of this species collected since 1960 and deposited in the Ohio State University Museum of Zoology are:

Mississippi River

Ohio River

Tennessee River

Duck River 1964 (OSUM 14839 SF, 12217), 1965 (OSUM 14489, 34022).

Elk River 1965 (OSUM 16154), 1966 (OSUM 19052 SF).

Clinch River 1963 (OSUM 8527).

Powell River 1967 (OSUM 19373, 19534, 22196 SF), 1968 (OSUM 20778), 1969 (OSUM 23190).

There are no known recent records from the Tennessee River proper nor from the Nolichucky or Holston Rivers where it was formerly known. Repeated efforts to find some evidence of the continued existence of this species in the Clinch River since 1963 have failed. Efforts to find living specimens or reasonably fresh shells in the Duck and Elk Rivers since 1966 have not been successful. It may be that the

TVA found them in Duck R.

only surviving population today is the one remaining in that free-flowing stretch of the Powell River above the head of the Norris impoundment.

Potential Threats

This species has never been found living in the ponded stretches of rivers nor is it known from very small streams. Its continued existence in the Duck River, presuming that population still lives, is threatened by the proposed dam at Columbia, Maury County, Tennessee.

Much of its habitat (hopefully not all) in the Elk River has been subject to the smothering effects of quarry washings in recent years.

The population in the Powell River appears to be limited to less than 20 air miles of river, perhaps much less. It is flanked by the slack water of the Norris impoundment downstream and a combination of acid mine drainage and domestic sewage effluent upstream.

The Clinch River naiad fauna remaining above the Norris impoundment appears to be being eliminated from near the head of the river going downstream. Domestic sewage and/or recent industry may be the reason(s).

LITERATURE CITED

- Agassiz, Louis
1852. Uber die Gattungen unter den nordamerikanischen Najaden.
Arch. für Naturgesch. 18:41-50.
- Athearn, Herbert
1972. Mollusks of the tentative Tellico Dam inundation area,
IN additional Macroinvertebrates.
Tenn. Valley Auth., Tellico Project Environmental
Statement Volume II:11-12-6.
- Call, Richard Ellsworth
1885. Geographical catalogue of the Unionidae of the Mississip-
pi valley.
Bull. Des Moines Acad. Sci. 1:1-57.
- Conrad, Timothy A.
1835- Monography of the Family Unionidae, or naiades of
-1838 Lamarck, (fresh water bivalve shells,) of North America,
illustrated by figures drawn on stone from nature.
J. Dobson, Philadelphia, 119 pp., 66 pl.
- Haas, Fritz
1969. Superfamilia Unionacea.
Das Tierreich 88:i-x, 1-663, 5 figures.
- Hinkley, Anson A.
1906. Some shells from Mississippi and Alabama.
Naut. 20(3):34-36, (4):40-44, (5):52-55.
- Isom, Billy G. and Paul Yokley
1968. The mussel fauna of Duck River in Tennessee, 1965.
Amer. Midl. Nat. 80(1):34-42.
- Isom, Billy G., Paul Yokley, Jr. and Charles H. Gooch
1973. Mussels of the Elk River basin in Alabama and Tennessee--
1965-1967.
Amer. Midl. Nat. (Notes and Discussion) 89(2):437-
442, 2 tables.
- Jay, John C.
1852. A catalogue of the shells, arranged according to the
Lamarkian system, with their authorities, synonymes,
and references to works where figured or described.
New York, 4th Edition with supplement, pp. 479.

- Johnson, Richard I. and Horace B. Baker
 1973. The types of Unionacea (Mollusca: Bivalvia) in the
 Academy of Natural Sciences of Philadelphia.
 Proc. Acad. Nat. Sci. Phila. 125(9):145-186, 10 pl.
- Lea, Isaac
 1840. Descriptions of new fresh water and land shells.
 Proc. Amer. Philos. Soc. 1:284-289.
1841. Continuation of Mr. Lea's paper on fresh water and land
 shells.
 Proc. Amer. Philos. Soc. 2:81-83.
1852. A synopsis of the Family of Naiades.
 Philadelphia, 3rd Edition, pp. i-xx, 17-88.
1870. A synopsis of the Family Unionidae.
 4th Edition:xxx, 25-184, (4 to.).
- Lewis, James
 1871. On the shells of the Holston River.
 Amer. Jour. Conch. 6(3):216-226.
- Marsh, Philip
 1885. List of shells collected in central Tennessee by
 A. A. Hinkley and P. Marsh with notes on species.
 Published by the author. Aledo, Illinois, July 1885:
 1-10.
- Ortmann, Arnold E.
 1918. The naiades (freshwater mussels) of the upper Tennessee
 drainage. With notes on synonymy and distribution.
 Proc. Amer. Philos. Soc. 57(6):521-626, 1 map.
1924. The naiad-fauna of Duck River in Tennessee.
 Amer. Midl. Nat. 9(1):3-47.
1925. The naiad-fauna of the Tennessee River system below
 Walden Gorge.
 Amer. Midl. Nat. 9(8):321-373, 1 map.
- Simpson, Charles Torrey
 1900. Synopsis of the naiades, or pearly fresh-water mussels.
 Proc. United States Nat. Mus. 22:501-1044, 1 map.
1914. A descriptive catalogue of the naiades, or pearly fresh-
 water mussels.
 Bryant Walker, Detroit, Michigan, 3 volumes, °1540 pp.

Stansbery, David H.

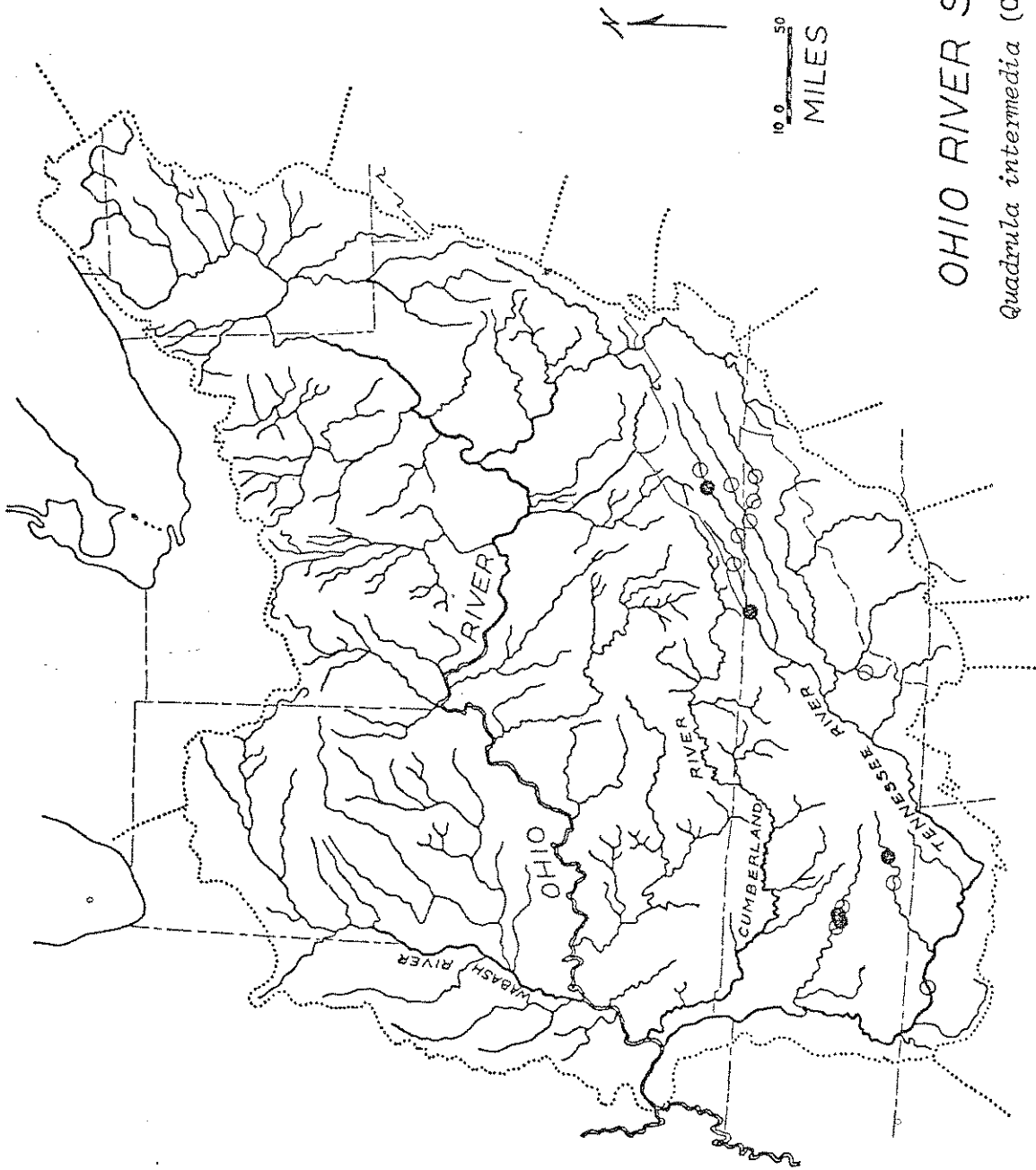
1970. 2. Eastern freshwater mollusks (I) The Mississippi and St. Lawrence River systems, in Arthur Clarke (ed.). Papers on the rare and endangered mollusks of North America.

Malacologia 10(1):19-21, 2 pl., 12 fig.

van der Schalie, Henry

1973. The mollusks of the Duck River drainage in central Tennessee.

Sterkiana 52:45-56, 1 map, 5 tables.

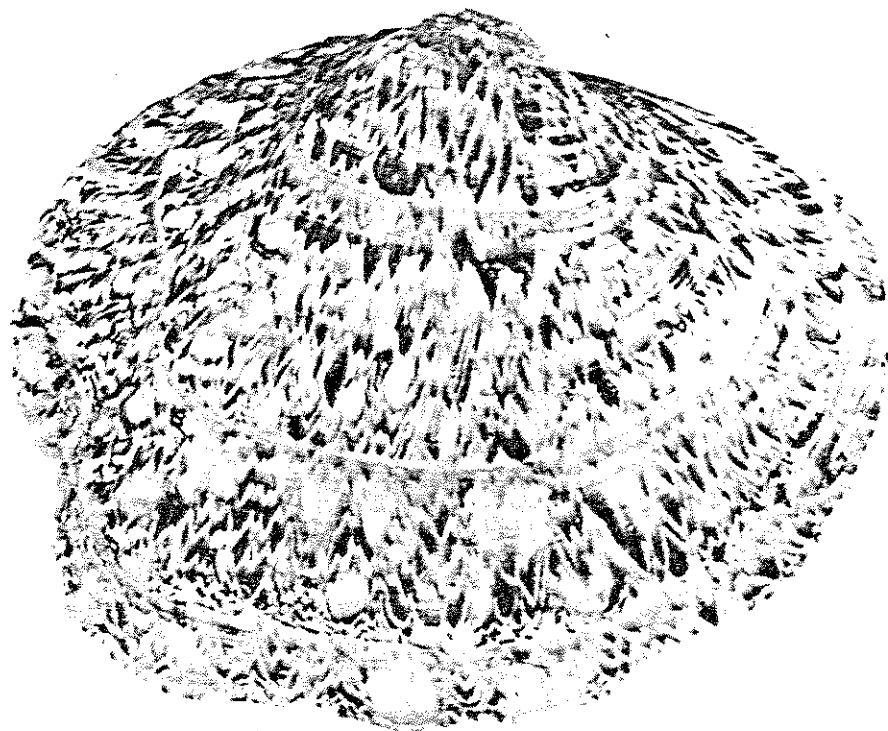


OHIO RIVER SYSTEM

Quadrula intermedia (Conrad, 1836).

○ = before 1960 ● = 1960 - 1976

KGB 1976



Quadrula intermedia (Conrad, 1836).

OSUM 19373.3, Powell River at Hoop,
Claiborne Co., Tennessee.

22 Sept. 1967. L=35, H=26, W=14 mm.